# THE IRON AGE

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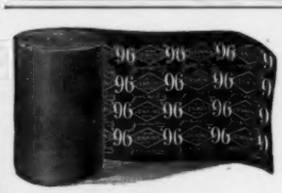


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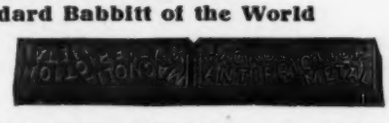

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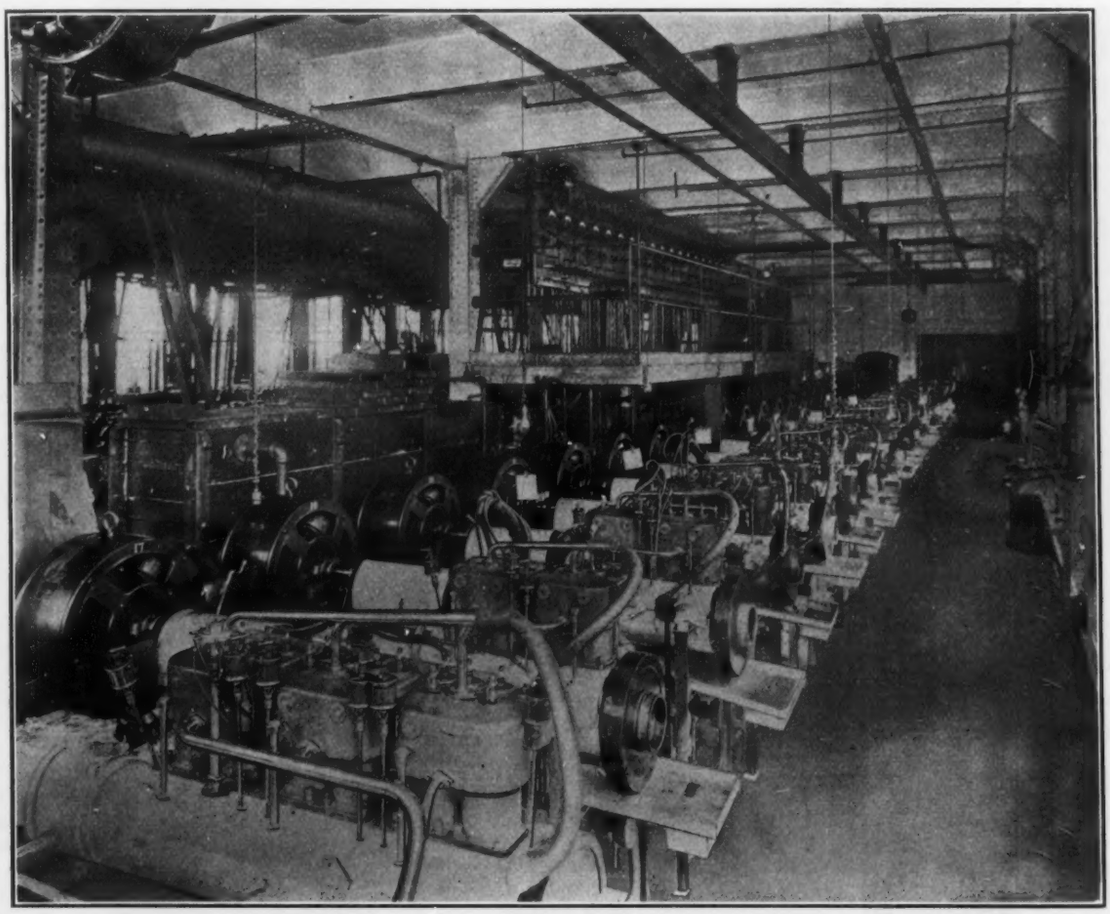
# THE IRON AGE

New York, Thursday, September 23, 1909.

## Stevens-Duryea Auto Engine Testing.

Utilization of the power developed by automobile engines under test in the driving of machinery used in the manufacture of more engines is the ingenious practice of the Stevens-Duryea Company at its plant at Chicopee Falls, Mass. Usually the work done by engines during testing is wasted. The oldest and commonest way is to absorb it in a prony brake, and the more modern way is to first convert the energy into electricity and dissipate it in a water rheostat or other resistance. The scheme followed in this case is much the same as the latter up to the point of disposing of the current, but it also has its individualities in certain of the details. Principally unique, however, is the turning of the current into the shop power supply mains, which is made worth while in this plant because of the number of engines usually under test at one time. The equipment in the testing room consists of 18 electric generators, each mounted at one end of a stand on which a four or a six cylinder engine may be placed and connected with the water, gasoline and ignition and generator systems installed in the testing room.



View in the Testing Room at the Stevens-Duryea Company's Plant, Chicopee Falls, Mass.

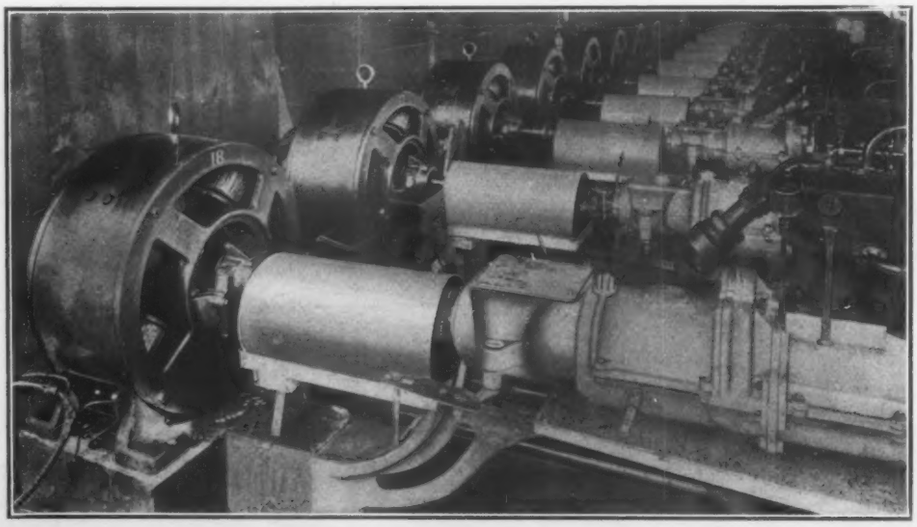
Each unit power plant is complete with all equipment when received from the motor, clutch and transmission assembling room, and after being placed on one of the testing blocks by means of a hand hoist with trolley running on an overhead I-beam, and connected to the different systems, the engine is started without cranking by using the generator as a motor. It is then run under its own gas without load for 2½ to 3½ hr., after which the generator is cut in on the factory power line and the test run continued for 10 hr. under loads varying with the model of the engine being tested. At this point the engine is taken apart, and every cylinder, piston, ring, bearing, cam and gear is inspected by experts. When found up to standard the motor is reassembled and again started and run idle for 2 or 3 hr., after which it is tested for maximum power. Standards are adopted for each model, and each engine has to attain these in power and frictional resistance as determined by the readings of electrical instruments before it is passed on to the car assembling department.

The engines are run as nearly as possible under the conditions that exist in road use. The gasoline pressure is the same as in the car obtained by the use of a small tank located outside the building in which the proper level above the carburetor is maintained by the use of a ball cock interposed in the fuel line between a large 900-gal. tank and the small one. The latter is equipped with an automatic device for ringing a bell when the gasoline stops running into it, indicating that the large tank is empty, but it still holds enough to keep the motors running until the large tank can be refilled.

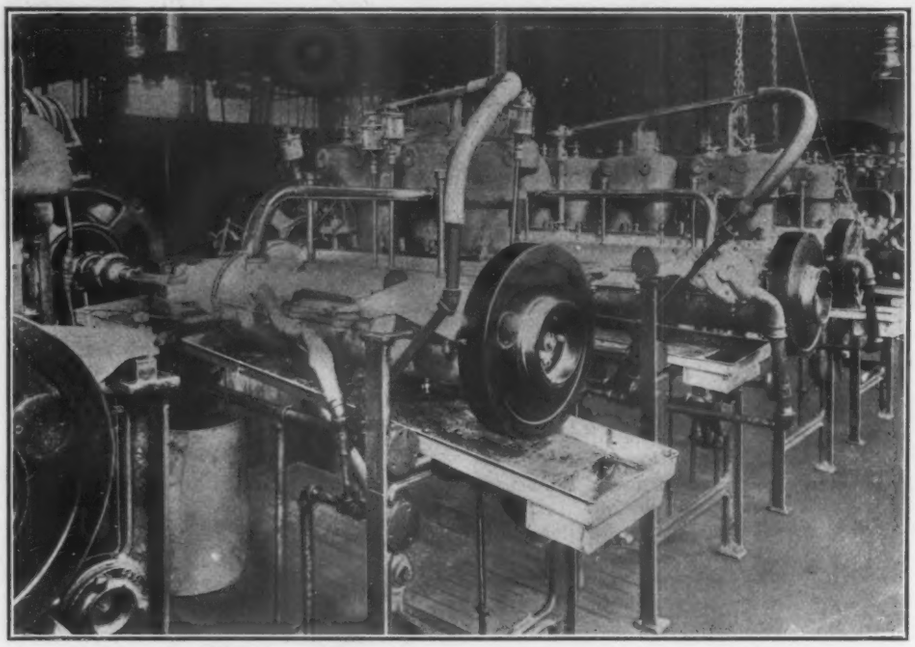
The water system is constructed so as to give the same pressure and circulation as in the finished car. At each end of the room is located a large tank provided with an overflow and supply pipes by means of which the water can be kept at a uniform temperature. These tanks are connected with each other at the top and bottom, and the engines on the blocks are supplied by pipes at each end and in the middle of the room. The return is taken entirely from the center and put through a centrifugal pump and by-pass, so that whether 1 or 18 motors are running the flow of water is the same through each engine. The exhaust system is as carefully worked out.

All engines exhaust into one large pipe, and by means of an automatically controlled electric fan pump, the gas pressure in the different manifolds is kept the same as when one motor is working alone.

Even the ignition system is the same as on the delivered car, regular stock spark coils being used. However, the current is supplied by a small motor generator set reducing the pressure from the generated 550 volts down to 6. Magnetos are also used. The electric generators are Westinghouse 17-kw. 550-volt, direct current machines, and the electrical output is used to operate the factory is understood to be the only one of its kind in use in the country, and as compared with the methods of testing by belt, prony brake, air fans, water pumps and screws is as much of an advance as the modern six-cylinder automobile engine is to the single cylinder motor. Not only is it an improvement from the standpoint of economy, but it also has value in an emergency, as was demonstrated a short time ago when a large pulley burst putting a big belt out of commission, which required over a



The Connection of the Engines and Generators and the Locking Device for Holding the Transmission Gears in Mesh.



Four and a Six Cylinder Engines Under Test with the Water Connections and Type of Stand Used.

which are connected in parallel through the nine-panel switchboard with a large motor generator set. The latter, a 150-hp. machine, transforms the alternating current with which the factory is mainly equipped to direct and supplies elevators and machines driven by direct current motors. The output from the blocks, ranging from 75 to 125 hp., relieves this transforming set, so that it draws very little current from the main generator.

After the motors are tested on the blocks they are assembled in the chassis and again rigorously tested on the road by experts where all finishing adjustments are made. The car is then put through the paint and trimming shops, after which it is again tested on the road, so that by the time the car is delivered it is sure to be absolutey right in every respect.

This system where the motors are tested on blocks week to replace. By connecting up spare motors and throwing a heavier load on the test blocks the factory lost no time by the accident.

The Frontier Boiler Mfg. Company, recently incorporated at Buffalo, N. Y., with a capital stock of $100,000 to engage in the manufacture of boilers, tanks, stills, stacks, structural steel and plate work, has secured the plant of the American Bridge Company at Bailey avenue and the Pennsylvania Railroad with a building 100 x 500 ft., and is equipping it with punches, shears, bending rolls, cranes, &c. A. B. Douglas, formerly with Farrar & Treffts, manufacturers of engines and boilers, is president of the new company, and Henry A. Bittner is secretary and treasurer.

## The Engine of Fulton's Clermont.

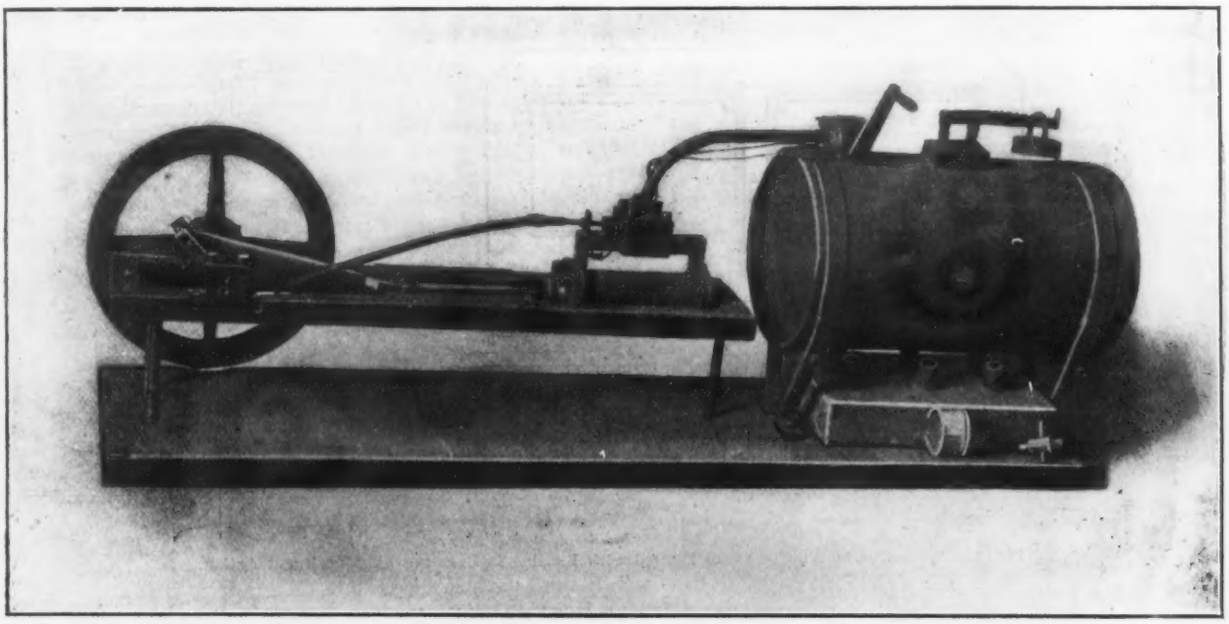
It is an interesting historical fact that Robert Fulton, who first made the steamboat a commercial success, was not the designer of the engine which propelled the famous Clermont on the Hudson River, ushering in the era of steam navigation. The engine was designed by Henri Frederic de la Frasse, who about 1803 had a machine shop on Fair street, now Fulton street, New York, where he made models and did other work calling for the utmost precision. He was the only machinist of note then to be found in the city of New York. Capt. George W. Church, a grandson of Mr. Frasse, and who resides in Newark, N. J., has in his possession a small engine handed down from his grandfather, which he treasures as the model of the engine used in the Clermont. The accompanying illustration is a reproduction of a photograph of this model recently taken for this purpose by Frank K. Chew. For the historical points given below we are indebted to Henry Frederic Frasse 2d, also a grandson:

As a man who had lived in France and spoke the language of that country, Mr. Frasse became acquainted with Fulton, who ascertained that the machinist could formulate and put into practical mechanical shape the necessarily crude ideas which Fulton had in mind. It will be recalled that Fulton was an artist and not a mechanic, except in an amateur way, and not in the sense of boat engine conception, as shown by his audience with Napoleon, which resulted in his not gaining that monarch's favor and interest in his boat, which was unsuccessfully tried on the Seine. As Mr. Frasse had had practical experience in Europe and had seen all the types of the then existing steam engines, his knowledge served him to apply the proper kind for driving a boat by means of side wheels. The outcome was that Mr. Frasse undertook to make a small model steam engine calculated to drive a boat. Drawings were made, and from them wooden patterns and castings were produced.

In those days there were no steam driven lathes, but they were operated by foot or hand. Sometimes it was necessary to enlist the services of the apprentice to turn a crank for increasing the speed of a pulley in the operation of turning or drilling soft metals. There were, no doubt, several sessions where the man with a desire and the other with mechanical ability talked over their hopes in the success of a boat steam driven.

At last the engine was completed and following that a small boat was built, and when the two were assembled a trial was made on the Collect, as the pond was called on the site of which the Tombs and the Criminal Court Building now stand, that pond made famous by the previous trials of John Fitch. What body of water could have been more appropriate than that, whose surface had been ruffled by the boat impelled by steam and rows of oars, a score or more years previous? The trial took place on Sunday afternoon and was witnessed by scores of people, for, with the curiosity of Americans, they gathered to watch and comment, just as they did several years later when the Clermont made its memorable trip up the Hudson River. After the model engine was perfected it was taken by Fulton to England and followed in detail by Boulton & Watt, the result being the engine which served as motive power for the Clermont.

How much money Mr. Frasse received for the model there is no way of ascertaining, for all records have been lost during the lapse of a century, but that he made the model and was really the brains that brought Fulton's ideas to fruition is proved by the now living Mrs. S. J. Frasse, a daughter-in-law of the maker, who at an advanced age recalls talking with her husband's father and also remembers seeing models, replicas of the original Clermont engine, in Mr. Frasse's place of business, adding that they constituted a regular article for sale. Later, upon the demise of Mr. Frasse, in 1850, one of his sons, William Henry Frasse, used the same patterns as employed by the Clermont model, made duplicates and sold them. The grandson of the subject of this story, Henry Frederic Frasse 2d, recalled as a small child going to the place of business of his father, William Henry Frasse, in old Chatham street, now Park row, and seeing the same models in a glass showcase. Moreover, the late Charles H. Haswell, who was in the employ of New York City for some 50 years, was well acquainted with the senior Frasse, and were he alive could attest to the truth of these facts gained through conversation with the inventor and through having seen the original drawings. He so stated to the grandson.



Model of the Engine of Fulton's Clermont.

The subject of this article was born in La Brevine, Switzerland, his ancestors having for many years been freeholders of a community La Frasse Sollanche, in the Duchy of Savoie. His name is carried by his daughter-in-law, Mrs. S. J. Frasse, widow of William Henry Frasse, residing in Monterey, Cal., with her son, Dr. Irvin N. Frasse, a well-known surgeon; another son, named after his grandfather, Henry Frederic Frasse, is one of the officials of the Edison Electric Illuminating Company, Brooklyn, N. Y. The late Peter A. Frasse, who for many years carried on the hardware business in New York now conducted under the name of Peter A. Frasse & Co., was another son of Fulton's colleague. A daughter was the mother of Captain Church, who for many years was with Peter A. Frasse, then a partner in Montgomery & Co., later of the firm of Church & Sleight, and now managing the New York agency of the Chicago Rawhide Mfg. Company.

# Removing Oil from Machined Pieces.

BY FORDYCE W. BROWN, SPRINGFIELD, ILL.

The following describes the apparatus employed by the company, with which the writer is connected, for removing from the product in course of manufacture, the oil and grease gathered during the different operations. The material consists of small screws, studs, &c., used in the manufacture of watches and made by automatic machinery, oil being used freely to facilitate the work.

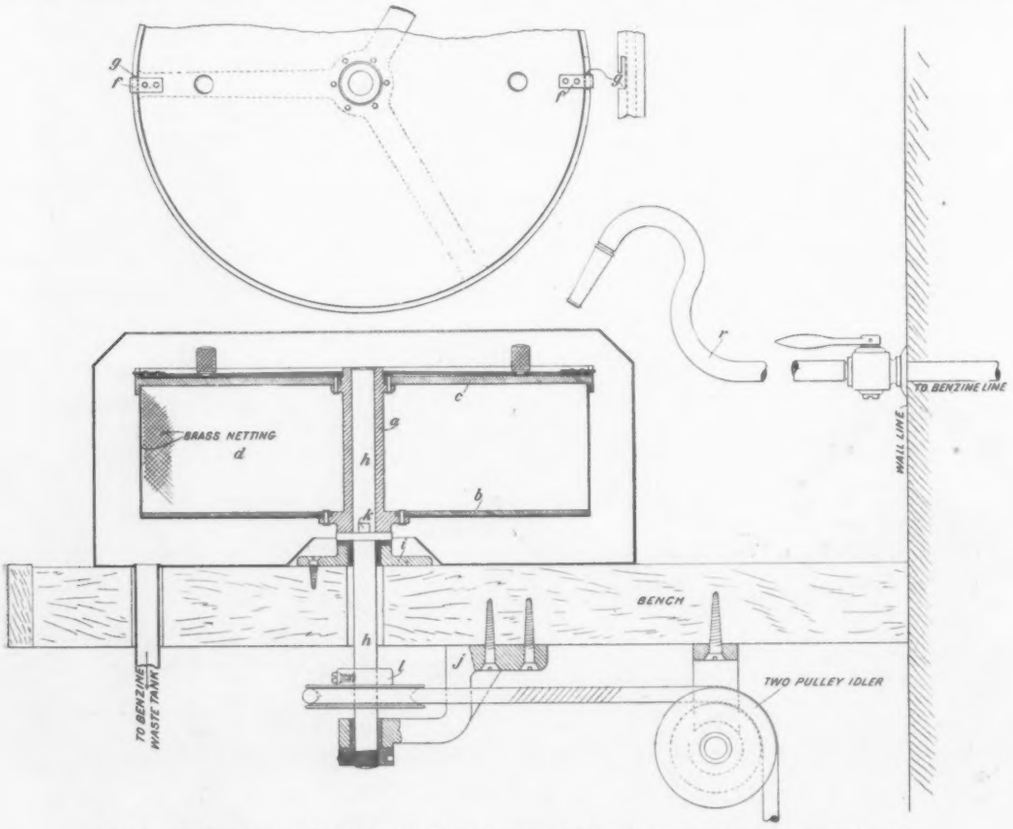



Fig. 1.—Apparatus in Which the Oil Diluted with Benzine Is Removed by Centrifugal Action.

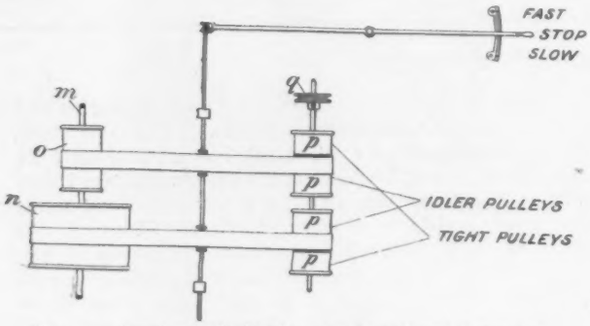



Fig. 2.—Countershaft Driving the Centrifugal Separator.

The material comes from the automatics in lots of 500 to 1000, dripping with oil, and before it can be used must be freed from all traces of oil and grease.

The operator first places the mass in a machine constructed as shown in Fig 1, consisting of the hollow central arbor *a*, turned from a steel bar, and carrying the circular steel plate *b* and the brass spider *c*. This spider has three arms situated centrally when viewed in cross section. Brass wire netting, *d*, is securely soldered in place around the outside of the plate and the inner edge of the spider. A top, *e*, of sheet brass fits smoothly into the upper end of the spider, and two small lugs, *f f*, engaging in the slots *g g* with a bayonet type fastening, prevent the cover from coming off while the machine is in motion. The complete head, as it is known, is mounted upon the upright shouldered spindle *h*, working in a bronze bushed collar, *i*, at the top and a similarly bushed bracket, *j*, at the bottom. A square key, *k*, in the spindle engages with a corresponding notch in the arbor *a* and causes the head to turn in unison with the spindle. This spindle is rotated by a belt running over the pulley *i*.

For reasons which will be explained later there are two speeds at which the head may be run. The main line shaft *m*, from which the machine receives its power, carries two pulleys, *n* and *o*, of different diameters, as will be seen by reference to Fig. 2. A countershaft mounted a short distance from *m* carries four pulleys, *p p p p*, directly opposite *n* and *o*; the two outside pulleys are each half as wide as the two inside ones, which latter are idlers while the two outside pulleys are keyed to the countershaft. At the end of the countershaft is the grooved pulley *q*, carrying a twist belt by which power is transmitted to the spindle *a*. A shipper lever working in a quadrant, as shown, controls the slow, fast and stop positions of the belts. Benzine is forced by means of compressed air from an underground tank to a small cock above the machine and a rubber hose allows a stream to be directed into any part of the head. The head is surrounded by a heavy circular receptacle, partly to catch the benzine as it comes from the machine and also to guard against accident should anything give way while the head revolves.

The operation of the head in freeing the mass of material from oil is as follows: The cover is first removed and a batch of screws and oil dumped into the head. The shipper lever is then pushed to the left, or slow position (having been in the intermediate or stop position); thereupon the head revolves at about 400 rev. per min. and a stream of benzine is turned upon the mass by means of the flexible hose. This is continued for several minutes, the speed of rotation being high enough merely to cause the benzine to work its way readily through the mass, taking up the oil from the material in its passage, and to fly off the brass netting against the shield, which retains and holds it. In about 10 min. the mass of material is stripped of oil, but is still wet with benzine. At this point the stream is shut off, the head brought to rest by putting the shipper in stop position and the cover of the head securely fastened down. The operator then moves the shipper to the right, or fast position, which accelerates the speed of the head to about 1200 rev. per min. The high centrifugal force generated thereby causes

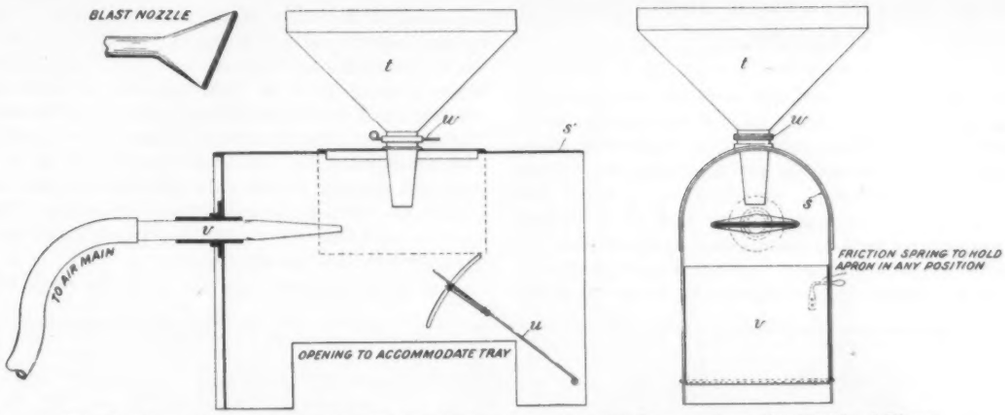



Fig. 3.—Apparatus for Separating the Sawdust and Its Absorbed Benzine from the Machined Pieces.

the greater part of the benzine to fly through the netting and escape against the walls of the shield.

While most of the liquid is removed in this manner, it is not possible to get the material thoroughly dry, and this is accomplished by drying the batch, as a final operation, in hot sawdust. To remove the sawdust from finished screws an air blast is used, controlled by a fixture consisting of an elongated member, *s*, Fig. 3, of inverted U-shape, carrying the hopper *t* and having an apron, *u*, which can be raised or lowered. The hopper is mounted on a saddle, as shown, so that it can be moved forward or backward. At the back of the fixture is a tube, *v*, which is flattened out to form a flaring and at the same time constricted nozzle, as shown in perspective in Fig. 3. This tube works friction tight in an elongated bearing, so that it is also capable of adjustment. A flexible hose from a compressed air main attached to the end of the tube completes the fixture.

The combined mass of sawdust and material, the latter now perfectly clean and bright, is poured into the hopper, the controlling slide *w* being closed. A tray having been inserted beneath the hopper to catch the screws, compressed air is admitted to the pipe *v* and so regulated by a stop cock that a steady stream of the desired force will blow through the member *s*. The slide *w* is then opened sufficiently to allow the mingled screws and sawdust to fall in a fine stream down into the film of air coming from the nozzle. The fine sawdust, being lighter than the material, is blown on through the front of the device and prevented by the apron *u* from mixing with the finished material, which by virtue of its greater weight drops into the tray at the bottom of the separator. It usually takes several trials to ascertain the proper relative position of the hopper, nozzle and apron, as some work is heavier than others, and sometimes the sawdust is heavier and soggier than at others, &c. If the operator finds that the finished material is being blown over the apron she raises it a little and moves the hopper back. If she finds that the sawdust is falling into the tray instead of going over the apron, she moves the hopper and nozzle forward and lowers the apron. In general heavy pieces and soggy sawdust require the nose of the hopper, the nozzle and the point of the apron to be in close proximity and the apron point low. Heavy material and light fine dust require a low apron, with the nozzle and hopper further back, while light pieces and light dust require the hopper and nozzle to be as far back as they will go and a high apron. All this was learned by experience, as were also many other things in connection with the system.

The former way of accomplishing the result was to wash the work as it came from the automatics in shallow trays filled with benzine and allow the material to dry by evaporation, being spread out for this purpose in other flat trays. This was always slow and never satisfactory, and the new system, which has been in use some five or six years, is a marked improvement. The oil used as lubricant for the cutters in the automatics is a medium grade of lard oil, which is readily soluble in the benzine. In Fig. 1 may be seen a pipe leading from the lower part of the shield, by which the mingled oil and benzine is conveyed to a distilling apparatus. Here the two liquids are easily separated, as the benzine is highly volatile, and each is used over repeatedly. The sawdust used is that of boxwood, very fine in grain and very absorbent. It is also used repeatedly, being gathered up from in front of the apron and returned to the drying trays and heated by steam to drive out the absorbed moisture.

## Large Brass Helices.

Reference was made in *The Iron Age* April 1, 1909, to the special screw machines developed by the Screw Cutting Company of America, Seventeenth street and Sedgeley avenue, Philadelphia, Pa., capable of cutting screws of any length, diameter, pitch or style of thread, mathematically accurate. The accompanying illustration shows some rather remarkable work done recently by this company for the United States Government. The brass helices shown were made by cutting a 1½-in. pitch thread, ¼ in. wide on hard drawn seamless brass tubes 3¾ in. in diameter of No. 18 Birmingham wire gauge (about 3-64 in. thick). It is reported that the work was done rapidly and accurately, and it is believed that it would have been extremely difficult to have accomplished it by any other process than the one employed by this company.

Large Brass Helices Cut by the Screw Cutting Company of America, Philadelphia, Pa.

The Wisconsin Engine Company, Corliss, Wis., has received a contract from the Forged Steel Wheel Company, which is building open hearth steel works at Butler, Pa., for two 20 x 36 in. engines to operate with generators in the new power plant, and from the Carnegie Steel Company, Pittsburgh, for a twin 32 x 42 in. engine for driving the Slick wheel rolling machine in its Homestead Works. The latter will be shipped about October 1.

## A Newton Special Crank Shaft Sawing Machine.

A new adaption of cold saw cutting off machines, as designed and manufactured by the Newton Machine Tool Works, Inc., Philadelphia, Pa., is herewith illustrated. Two cold saw cutting off machines, the bodies of which are of the Newton standard No. 3 type, are mounted, as shown, on a single bed and so arranged that the outside as well as the inside of the throw on crank shafts can be sawed and the machines adjusted to operate on both ends of the crank shafts at the same time, thus making two cuts at one time. This arrangement permits dispensing with the rotary planing machines used for the outside of the crank shafts, as, after sawing the outside of the throw, the shafts are placed in a lathe and an undercut made, thereby removing the superfluous material in one large piece, instead of in small chips as is done when the rotary planing machine is used.

The spindle of each machine is driven through steep pitch and broad face hammered steel spur gearing and a hardened steel worm and bronze worm wheel with teeth of steep lead. The worm is provided with a roller thrust bearing and runs in a bath of oil. The spindles have constant friction feed, variable in both directions when using a reversing motor and a double throw switch. The machines are furnished complete with pump, piping and attachment for lubrication, and are of more than sufficient rigidity to drive the modern inserted tooth saw blades to their limit of cutting capacity. The blades on the machines shown in the illustrations are of the Premier inserted tooth type.

The work tables of the machines are of an exceptionally convenient design, with tee slots on both the horizontal and vertical faces to secure work holding fixtures. The adjacent faces are arranged so as to permit the clearing of the saw blades, and removable auxiliary supports are provided, as shown in Fig. 1, so that if necessary the work can be clamped on each side of the saw blade. All the levers for controlling the operation of the machine, as may be seen in Fig. 2, are located in front in easy reach of the operator. The hand wheel A

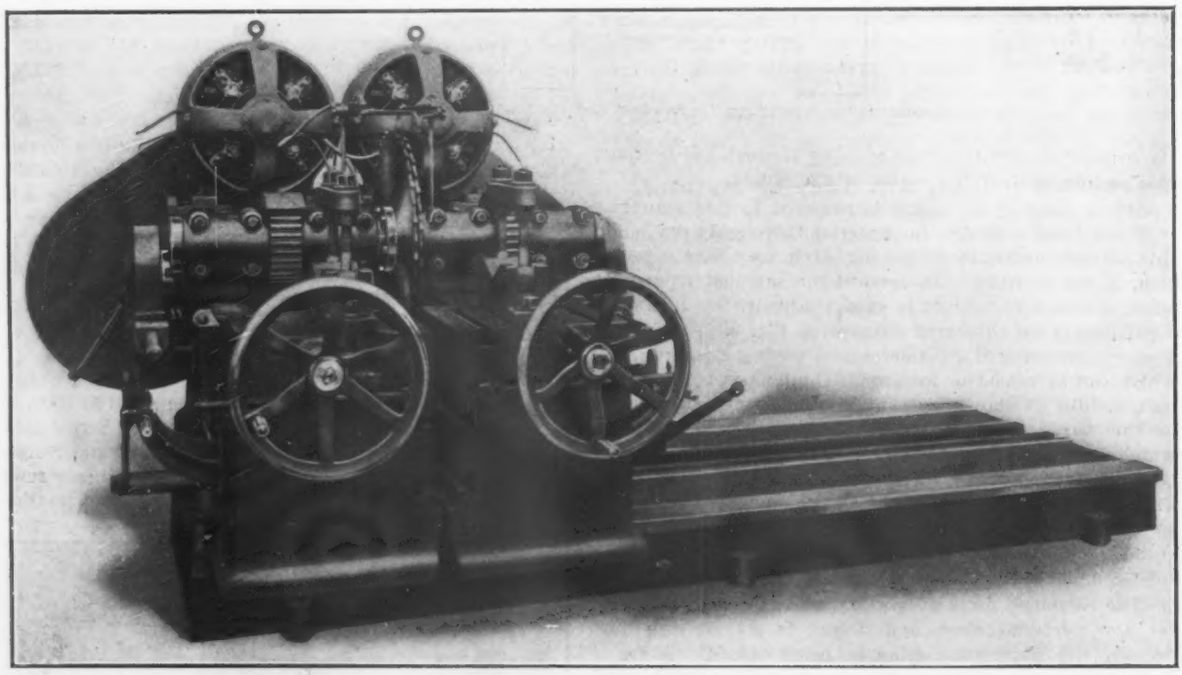


Fig. 1.—A Special Machine for Cutting Crankshafts, Built by the Newton Machine Tool Works, Inc., Philadelphia, Pa.

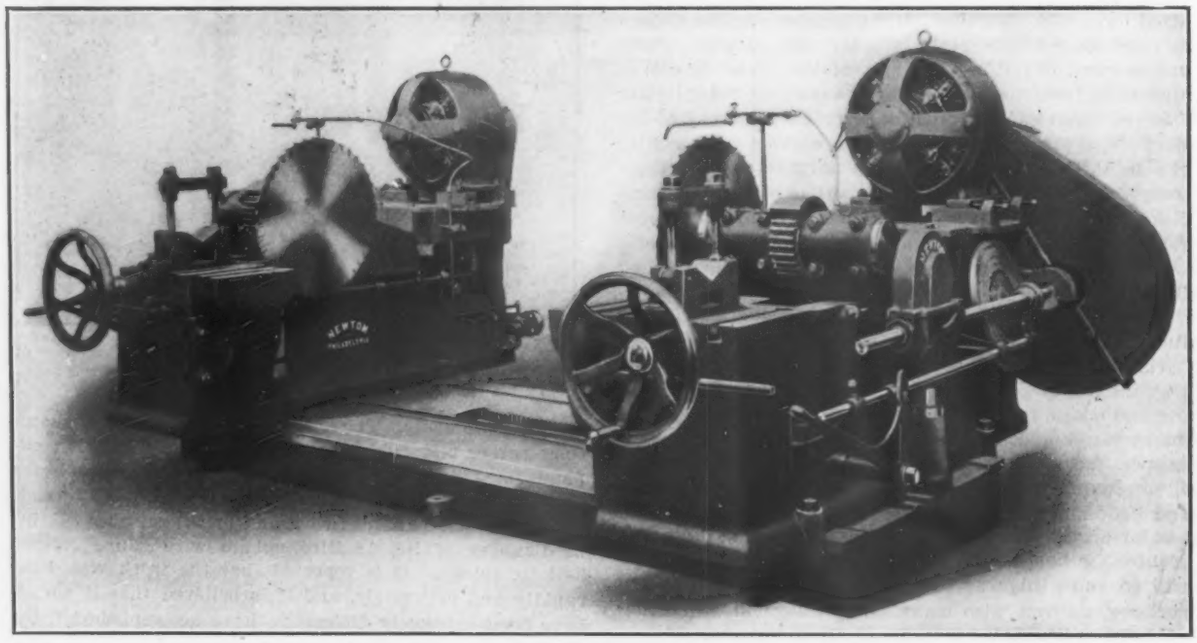


Fig. 2.—Another View, Showing the Two Cold Saws at a Distance from One Another.

controls the hand adjustment of the saddle and is detachably fitted on the square end of the adjusting screw so as to permit removing it when cutting angles or very broad work which would extend over the points where the hand wheels are located. Lever B engages and disengages the feed and quick return. Lever C shifts the friction roller for varying the feed. The crank hold D operates a pinion meshing a rack on the bed through which the movable machine may be adjusted from or toward the left hand machine, which is bolted in a fixed position on the bed. In connection with the lubrication system, the base of each machine just back of E contains a reservoir for holding the lubricant.

Each individual machine is driven by a 7½-hp. motor, connected by chain or gear to the driving shaft. The total weight of the machine approximates 20,000 lb., the diameter of the saw blades is 28½ in. and the capacity for round stock is up to 8½ in. in diameter and 15-in. I-beams in vertical position taking square or miter cuts.

## The Kern Drilling and Tapping Machine.

A machine combining the functions of a sensitive drill press and a tapping machine has been perfected by the Kern Machine Tool Company, Cincinnati, Ohio. Particularly novel is the arrangement whereby the means of obtaining the reversing drive of the tapping attachment is made use of in doubling the forward speeds, as it is believed to be the first application of the principle in a drilling machine. By so increasing the range of drilling speeds it is claimed that a considerable saving of time is effected. As a drill the machine embodies all the regular features of an approved sensitive drill press, but provides more than the usual number of spindle speeds, there being six.

Three of these six spindle speeds are obtained through the three-step cone, as indicated in both Figs. 1 and 2. By shifting a clutch on the back shaft, shown in Fig. 2, either of the two pulleys on that shaft may be engaged so as to drive the large and small spindle pulleys in either direction, and by making either of these, through another clutch, the spindle driving pulley, the range of speeds is doubled. Fundamentally the two friction pulleys are of different diameters to permit of the rapid backing out of taps, and it is claimed that with the use of the clutch starting, stopping and reversing of the spindle are accomplished without shock or jar. Thrust ball bearings are provided for the spindle. The danger of breaking tools is avoided by the use of the friction drive of the spindle, as the friction can slip before the breaking point of the drill or tap is reached. The strength of the friction engagement is adjustable to vary the transmissable torque according to the work.

The spindle is counterbalanced and is provided with an adjustable lever for the rapid approach and return of the drill. The table is of the square, oil grooved type, amply large, and is provided with a cup center and V block. Both the head and table are adjustable vertically on the column of the machine. A specially made endless belt is furnished for the upper friction pulleys, which insures a powerful and steady drive, and a screw adjustment of the pulley shaft frame is used to regulate the tension of the belt.

The normal hight of the tool is 79 in.; the total hight with the spindle extended 99 in.; the maximum distance from the spindle to the table 41 in.; the size of the table 12½ x 14 in.; the traverse of the sliding head 15 in., and the traverse of the spindle 5½ in. The machine drills to the center of a 15-in. circle, and the spindle speeds are 200, 340, 420, 480, 550 and 1000 rev. per min. The diameter of the spindle in the sleeve is 15-16 in., and the diameter of the spindle above the sleeve ⅞ in. The speed of the countershaft is 500 rev. per min. The spindle is fitted with a Morse No. 2 taper socket. The tight and loose pulleys are 2⅛ in. face by 6 in. in diameter. The floor space required is 28 x 34 in., and the net weight 425 lb.

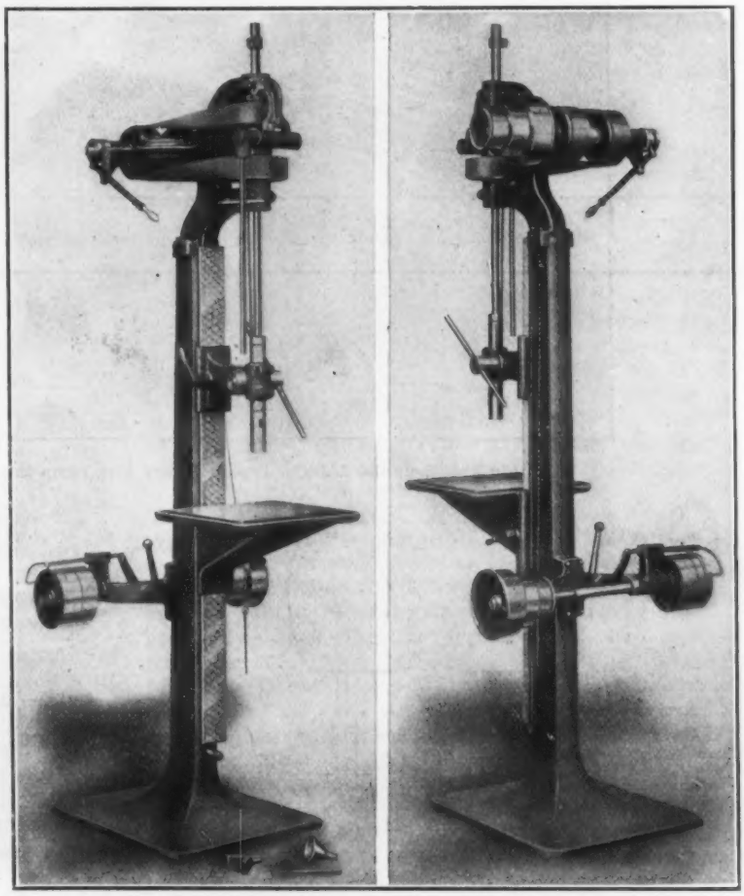


Fig. 1. Fig. 2.
Two Views of the New Drilling and Tapping Machine Built by the Kern Machine Tool Company, Cincinnati, Ohio.

**Freight Rate Reductions.**—Important reductions in freight rates on iron and steel commodities from Pittsburgh and other points in western Pennsylvania and eastern Ohio have gone into effect. Effective September 10, the carload rate on steel rails from Johnstown, Pa., and Cumberland, Md., was reduced from $14 to $13.70 per gross ton. A new special commodity rate of $13.10 per gross ton on rails from Lorain, Ohio, to Pacific Coast terminals has also been made. Effective September 20, car wheels and axles, when shipped in straight carloads, were given a rate of 77 cents per 100 lb. from Pittsburgh, Butler, Homestead, McKees Rocks and Munhall to the Pacific Coast. The old tariff imposed the local rate between these points and Chicago or St. Louis, plus the 65-cent commodity rate regularly charged on car wheels between St. Louis or Chicago and the Pacific Coast.

**The Erie Railroad Trying a New Cab Signal.**—Experimental tests have been made on the Newark branch of the Erie Railroad with the La Croix cab signal, the rights to which are owned by the Electrical Automatic Railroad Safety Signal Company, New York. The inventor claims that it will make collisions impossible. The signal is placed on the engine, and connections are made with the line wires through a shoe, which at certain points contacts with a short section of third rail. The apparatus is controlled by track circuits as in automatic block signaling. It is a closed circuit system, so that a break in the wire or failure of the battery will set the stop signal.

# The New Fales & Jenks Rotary Fire Pump.

The manufacturers of rotary fire pumps are bringing out a new design known as the type B, under specifications drawn up by the Inspection Department of the Associated Factory Mutual Fire Insurance Companies. The pump shown in the illustrations, built by the Fales & Jenks Machine Company, Pawtucket, R. I., is one of this class. It is of the well-known twin rotary type, built in a very substantial manner and with improvements tending toward greater efficiency, durability and reliability. The pump has been standardized in four sizes, the purpose being to get rid of the multiplicity of sizes and individual arbitrary rating by the builders, with the tendency to overrate actual possibilities for fire service. Fig. 1 shows the pump geared for motor drive and equipped with a double relief valve, there being a partition in the Y casting to separate the discharge from each valve.

The principle points of difference between a rotary pump of this design and the ordinary commercial machine are that the water passages are made larger, so that there is less loss of pressure in getting water to and from the pump, that the pump is proof against rust, its working cams and water casing being of solid composition metal, so that it can be started instantly after dis-

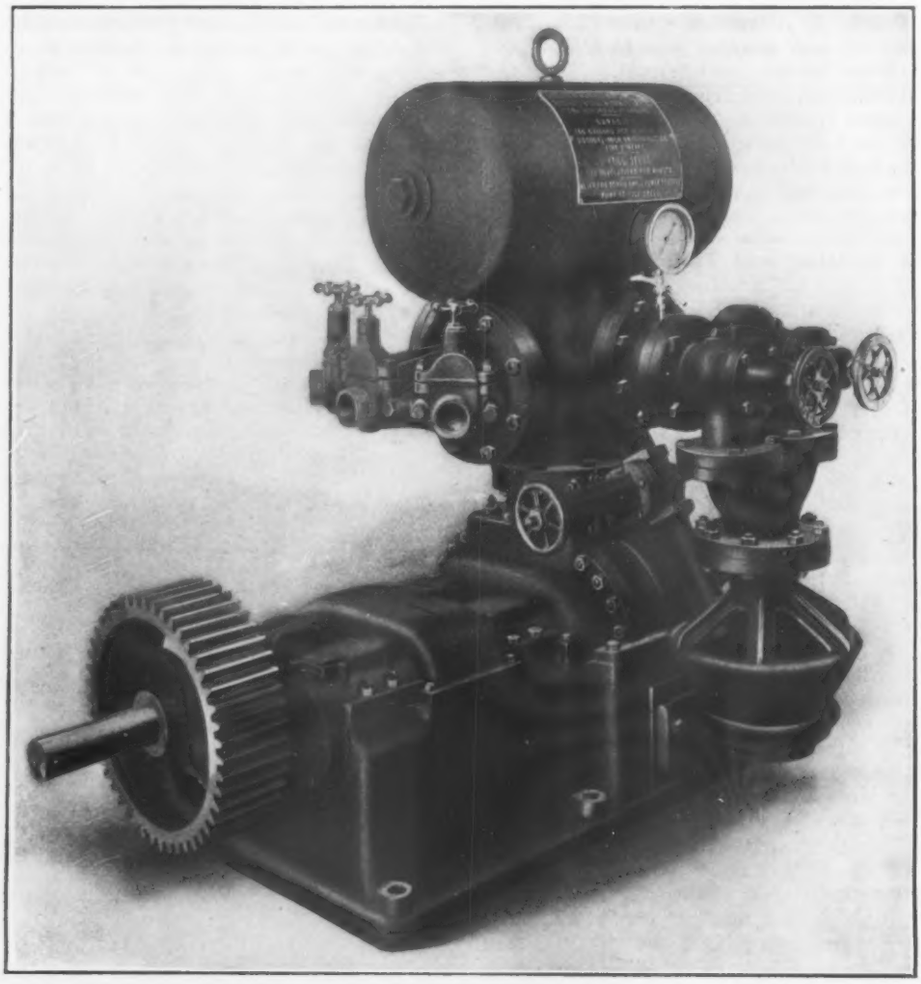


Fig. 1.—The Fales & Jenks Type B Rotary Fire Pump Equipped for Motor Drive.

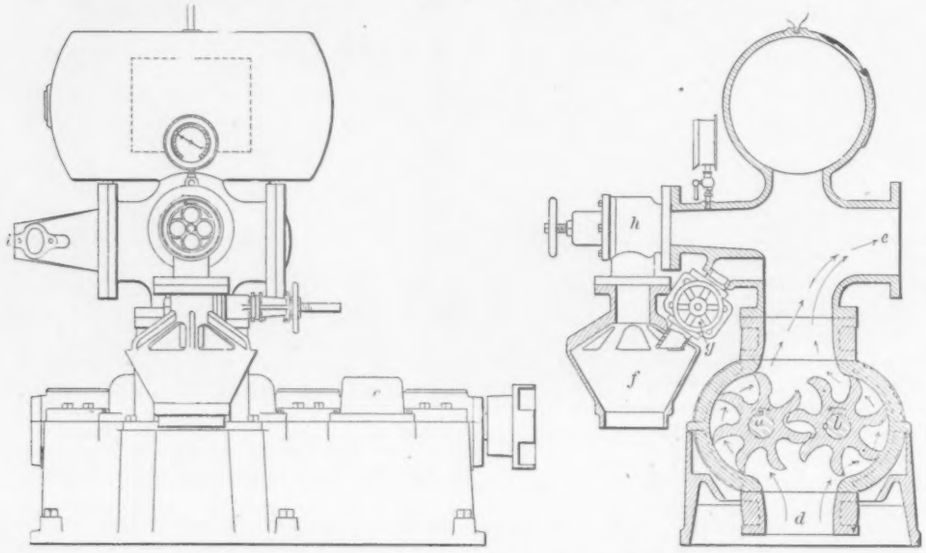



Fig. 2.—Side and Sectional Transverse Elevations of the Pump.

use; that the shafts are made heavier and the bearings more liberal, with special arrangements to insure constant lubrication, and that a single pair of accurately cut steel gears on the driving end of the pump replace the usual two pairs of gears, a pair in each end, for driving the second cam or bucket shaft. The pump has a special discharge casting and air chamber, together with special fittings, including pressure gauge, relief valve and cone, priming pipe and valve, starting valve and two to six hose valves according to the capacity.

The details of the Fales & Jenks pump, built after these general specifications, are shown in Fig. 2. The power is transmitted to the buckets, or cams, as they are technically known, through the shaft *a*, the shaft *b* being connected with it through a pair of gears at *c*. Thus one cam shaft drives the other, and also the cams are so designed that those on shaft *a* would drive those of shaft *b* were the gear connection broken, a means of transmission which was employed in the earlier types of rotary. The cams are so shaped that they mesh perfectly with the movement of the driving gears, thus preventing the water from forcing back the suction through the center. The second set of gears at the tail end of the pump has been dispensed with, abandoning a practice that had been in vogue for many years. Heavier shafts and one powerful set of gears on the driving end are believed to accomplish better results, the theory being that where two sets of gears are employed before the second can do any work there must be a torsional stress in the shaft between it and the first set, and before this stress has transmitted any power to the second set it has overcome the load at the cams and therefore done the entire work required.

The inlet to the pump is at *d* and the discharge at *e*, while the relief valve which takes care of excess pressure is shown at *h*, and the starting valve at *g*, both discharging into the cone or funnel *f*. It will be noticed that the water passages are very large, while all edges in the discharge are rounded as much as possible, it having been established by test that the loss in capacity through the existence of sharp edges is a material one, seriously reducing pump efficiency.

The twin rotary type is not economical of power, though in this new design the makers believe that a material increase in efficiency has been effected as compared with previous models. The rotary is seldom used where a continuous or daily service is required, partly because of its degree of efficiency and partly because of the absence of means of compensating for wear inside the pump, which is not conducive to long continuous use. For fire purposes, however, where its use is naturally infrequent, it has its own strong advantages in the ease with which it will begin operating at full service, together with its ability to lift water a moderate distance, which latter feature is not shared by pumps of the centrifugal type; also the strength of mechanism and construction puts no limit in practice on the pressure it can handle.

The rotary pump is a favorite type for driving by water power and is coming into more common use with electric motor drive. With reasonable care, particularly to avoid freezing and prevent the admission of foreign bodies, this type of pump will endure indefinitely. Carelessness in these respects is responsible for a large percentage of trouble. In modern installations the danger is largely eliminated because of the location of the pump in connection with an electric motor, which must be protected from the elements. The standard sizes follow:

| Nominal capacity. Gallons per minute. | Approximate width of buckets. Inches. | Approximate distance between centers.—Inches. | Speed. Revolutions per minute. | No. of 1⅛-in. streams. | Approx. horsepower required for 100 lb. pressure |
|---|---|---|---|---|---|
| 500..... | 8 | 7 or 8 | 275 | 2 | 60 |
| 750..... | 9 or 10 | 8 or 9 | 275 | 3 | 90 |
| 1,000..... | 10 | 9 or 10 | 250 | 4 | 120 |
| 1,500..... | 12 | 10 or 12 | 250 | 6 | 180 |

The theoretical amount of power necessary to give a pressure of 100 lb. per square inch, with a delivery of 100 gal. per minute, is 5.24 or 53.4 hp. for 1000 gal. per minute under 100-lb. pressure. This includes no allowance for friction of water, for slip and for friction in the pump itself, and in the driving gear. Experience with pumps now in use shows that these losses, as pumps are commonly found set up, about double the power necessary, so that 12 hp. is usually required for each 100 gal. per minute delivered at 100-lb. pressure, and 30 hp. is the usual allowance for a 1⅛-in. stream, or its equivalent of from 15 to 20 automatic sprinklers.

## The American Fire-Arms Factory in Australia.

The New York *Times* prints the following statement from a London correspondent:

Not a little excitement and displeasure are felt in this country over the announcement that the tender for the erection and equipment of the Australian small arms factory has been let to the Pratt & Whitney Company, a United States firm. To justify this action, the Minister of Defense has published the following facts concerning the reasons for the contract:

The guaranteed plant will be interchangeable in all its parts. The American firm will receive three or four leading Australian workmen in its shops, and give them the best possible training without expense to the Commonwealth, together with opportunities of work in other shops where guns are manufactured. The plant will make 50 cadet and 50 M. L. E. rifles per day simultaneously. The deposit of £2000 ($10,000) is to be forfeited if the guarantees are not achieved. The plant is to be delivered in 12 months, subject to a penalty of $1400 a week. Noyes Brothers, an Australian firm, assume all responsibility for the guarantees. The firm will furnish all skilled help until the plant is in full operation, and will send out two foremen to train men in Australia free of cost, and pay the extra cost of inspection during manufacture.

Engineer-Commander Clarkson, who visited England and the United States in connection with the contract, claims to have proved by actual trial with materials obtained from Birmingham and Enfield that Pratt & Whitney's machinery can make small arms more efficiently than European machines, and that in many cases they can turn out double the work produced in England. The estimated cost for the present rifle (labor, supervision and material) turned out by the United States firm's equipment is £2 19s., which is lower than the figures of any British firm. In fact, there is a saving for the Commonwealth of 15s. 10d. on each rifle made by the American company, for it costs £4 5s. at the War Office, this figure including the cost of manufacture and exportation.

**The Herman Pneumatic Machine Works Enlargement.**—The Herman Pneumatic Machine Company, 1104 Union Bank Building, Pittsburgh, works at Zelienople, Pa., has recently increased its capacity by adding a new power plant of steel and brick construction, 40 x 60 ft., containing boilers, engines and generators of 150-kw. capacity, air compressors, &c. A new addition to the present machine shop, 40 x 60 ft., of steel and brick construction, is nearing completion. The Arthur Koppel Company, Pittsburgh, has the contract for this work. The Herman Company reports that during the last six months it has manufactured the largest jarring molding machines ever built. The dimensions are 6 x 9 ft., with a lifting capacity up to 15 tons. Among the large manufacturers using such machines are three plants of the United Engineering & Foundry Company; William Tod Company, Youngstown, Ohio; Buckeye Engine Company, Salem, Ohio; Modern Foundry Company, Oakley, Ohio, and Otis Steel Company, Cleveland. The works are being operated double turn.

The total production of briquetted coal in this country in 1908, according to E. W. Parker of the United States Geological Survey, was 90,358 net tons, valued at $323,057, as compared with 66,524 tons in 1907, valued at $258,426, a gain of 23,834 tons, or 36 per cent. in quantity, and of $64,631, or 25 per cent. in value.

# Special Sections of Iron and Steel.*

## The Rolling of Tie Plates, Concrete Bars, Sheet Piling and Other Shapes.

BY WILLIS M'KEE, ELYRIA, OHIO.

Until within a few years the question of rolling irregular shapes has been one of comparative simplicity, as most of the shapes it had been desired to roll were of comparatively plain cross section. But as it has been found desirable to have large quantities of metal bars and plates of more or less complex cross section, the question of rolling such shapes has become a matter of importance. For the past five years the writer has been largely occupied in developing the possibilities of rolling steel into more or less complicated forms, and it is hoped that this brief discussion of the possibilities and methods of rolling such shapes, as well as the limitations on the work, will be of interest. The boundary between what is acknowledged as the possible and the impossible, between the practical and the impractical, is exceedingly flexible, for numerous reasons.

### Variables in Rolling Problems.

1. Rolling mill men themselves do not know the possibilities of their own mills.

2. New demands for large tonnage of certain sections justify the mills preparing for such sections and experimenting with them, when a few tons or even a few thousand tons would not in any way recompense the mill in rolling them.

3. New mills of new designs are opening up new possibilities.

4. Often a proposition of some special section is not put up to the mill which is properly equipped with machinery and brains to handle anything out of the ordinary standard sections, or at least to handle the particular sections in question.

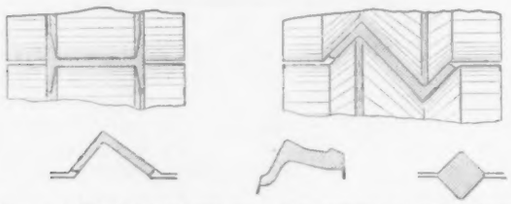


Fig. 1.—Standard Sections and Arrangement of Final Passes.

Neither the old school "do-as-your-fathers-did" mill man nor the technical man without extensive mill experience is qualified to say what can and what cannot be done. In a few mills there are organizations which are composed of a number of technical men together with some mill men who have been raised in mills and know mill conditions from start to finish, from a practical standpoint, and at the same time are willing to try to do new things in new ways. This is about the only combination that is able to work out the new problems which come up. The writer has been told by his rollers and roll designers that certain things were impossible, because they had never seen them accomplished, and the only way we were able to get around such opposition was to get new rollers and roll designers, as we knew that as long as the mill men took that position they could block any scheme that came up. It is absolutely necessary in order to get best results to work on the supposition that everything can be done until it has been shown that it cannot be done.

5. Necessity makes many things possible which do not originally appear so. Take, for instance, the old two-piece rail. Most modern mill men would say that this section could not be made, notwithstanding the fact that it was manufactured years ago when steel was being first introduced. The head of the rail was of steel, while the flange and web were of iron. Although this was a failure as a rail it is a very interesting example of early mill practice.

* Read at a meeting of the Western Society of Engineers, Chicago, September 1, 1909.

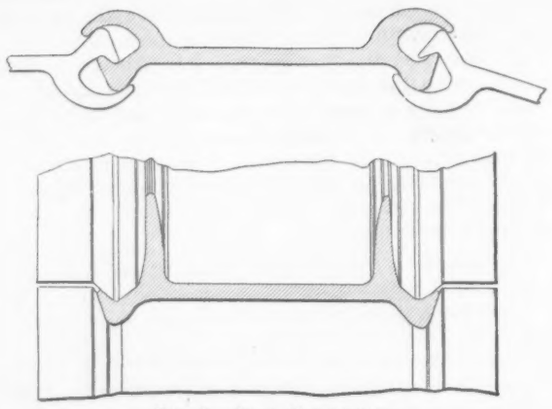


Fig. 2.—Steel Sheet Piling.

### Complete Contact in the Final Pass.

Rolls are practically dies, which in revolving form the metal to their contour. It becomes necessary, therefore, to confine our rolled sections to such shapes that the rolls in the last roll pass will come in contact with the whole of the surface of the section to be rolled. The illustration, Fig. 1, shows how it is customary to arrange the last pass in the rolls in rolling I beams, Z bars, splice bars, &c. This rule is apparently deviated from in the case of rolling some sections, such as lock piling, Fig. 2, but this is not truly a deviation from the rule, as these sections are rolled so that the material can clear the roll, and then in the last pass no work is performed but in bending over the flange. In other words, it is rolled in such shape that the rolls can come in contact with all the section, and then is simply bent over in a bending pass, in which there is no rolling or reduction. In this section, if it were required to make an absolutely perfect bar, it would be necessary to use the mandrel to hold out the piece in this bending pass. If this were not done there would of necessity be some irregularities in the section that the roller could not control, as the rolls cannot come in contact with both sides of the flanges in the last pass.

Another example of somewhat similar rolling is the rolling of a door hanger, Fig. 3. In this instance we do not have just the same trouble. As the section is circular it can be conformed outward by the piece being tightly confined against the tongue of the top roll, but the pass that forms this section up is strictly a bending pass and not a rolling one. The writer has had considerable experience in the manufacture of structural and bedstead tubing, Fig. 3, which is formed up in a mill, but we would hardly consider that we rolled the tubing, although the piece leaves the mill in the shape of a tube. In reality we roll the skelp or flat strip of steel, and then form this up into the round by means of bending rolls and guides; but there is no reduction of the section after beginning to form it up, so it is in reality a hot continuous bending operation and not a rolling one. We roll

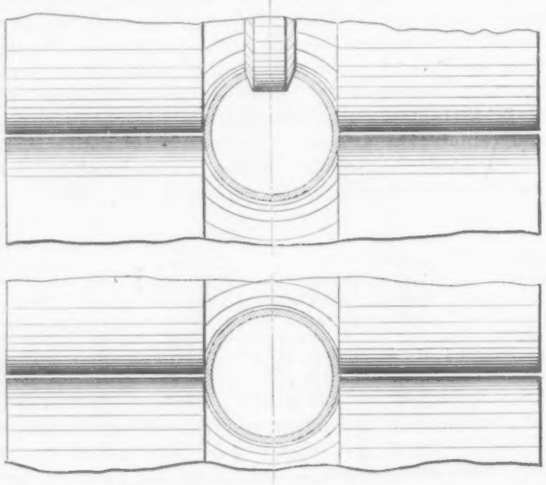


Fig. 3.—Door Hanger and Structural Tube.

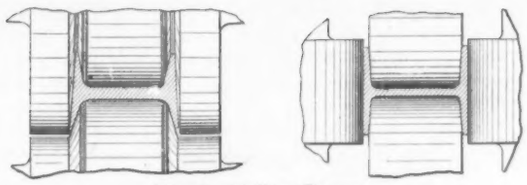


Fig. 4.—Rolling Beams.

this tubing from high carbon steel stock, and when desired braze the seam. On account of the nature of this stock it is found more desirable in many places than the ordinary welded tube.

**Bars for Reinforcing Concrete.**

Concrete reinforcing bars have become a large tonnage proposition, and rolling mills have done all in their power to meet the demands of the engineer for bars that will at all points have practically the same area of cross section, and at the same time have such irregularities as to attach them properly to the concrete. With the exception of sections like the Kahn, which are slit after being rolled, and the twisted bars, practically all these sections are rolled on rolls with irregularities milled or chipped into them. Rolling mill men naturally do not desire rollings of this kind, for the reason that they have to be equipped to finish their rolls in a milling machine at an additional cost, and then on account of the nature of the rolls, it is impossible to roll a tonnage equal to that produced in plain rolls. It is also impossible, as a rule, to use a chilled finishing roll on such work, on account of the difficulty of finishing it, and it is necessary to fall back on steel rolls which will not last as long as chilled rolls and which roughen up very soon. Of course, such little roughnesses on the concrete bars are not usually regarded as serious. The twisted bar is rolled straight and in some mills is afterward twisted on the hot beds before it cools, while at other plants it is twisted cold.

**Beams and Channels.**

Steel columns have for years been made in two ways: small ones of a single I-beam and the large ones of built up sections. The point where it became expedient to change from one to the other is usually determined by the radius of gyration of the I-beam in the line of least resistance, the beam often being many times too strong in the other axis. It is impossible to overcome this in an ordinary beam, as the legs of the beam must have a decided taper—16 2-3 degrees being the usual practice—in order to clear the rolls, and it is impossible to make the flanges long. The left of Fig. 4 shows one of the reducing passes. In this pass, the bottom flanges are being lengthened, while the top flanges are shortened, because the same roll is on both sides of these flanges. The demand for a beam of practically square section led to the installation in Germany and afterward at Bethlehem, Pa., of special mills to roll such sections. These mills are arranged with two sets of rolls in the same plane, but with axes at right angles, the one set conforming the inside, and the other the outside of the beam. In these mills it is possible to roll sections with long flanges, and with flanges whose sides are nearly parallel. It is claimed, with seeming justice, that the metal of the section rolled on such a mill is of a more homogeneous character than if rolled by the former method, because it is possible to make practically equal reductions in the several parts of the sections in the succeeding passes, so eliminating the tearing tendency which is natural in the old style rolling. Another advantage claimed is that the circumferential speed of the rolls at point of contact is always practically the same, while in other mills it is often nearly twice as great at some points as at others, causing slipping and distortion of the fiber of the steel.

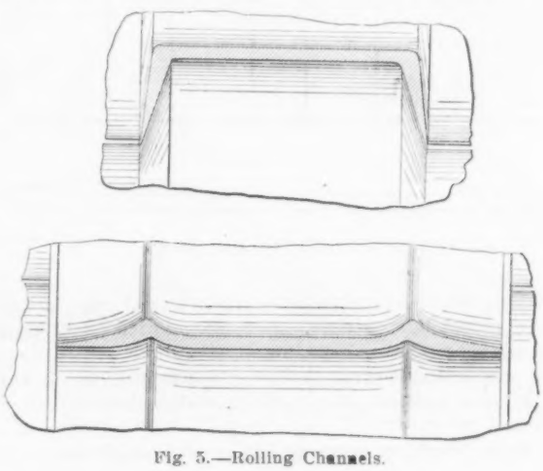


Fig. 5.—Rolling Channels.

In Fig. 5 are shown two methods of rolling channels, which are employed in order to get the required length to the legs. Now, if it were necessary to roll a similar section with a third projection near the center one would be unable to make this third projection as long as it would be impossible to use either of these two schemes in lengthening this third projection. If it were desired on the other hand to have only one projection, and that a central one, this projection could be given the required length by turning the bar on edge and dividing the rolls on the line of the projection, thus bringing one roll into contact with the top, and the other with the bottom side of the projection.

**Special Rollings.**

In Germany many sections of fancy molding are rolled and sold for prices ranging from $100 to $200 a ton. Such work has not appealed to the American rolling mills, because there are but limited tonnages of each section, and also because the carving of the rolls for such work

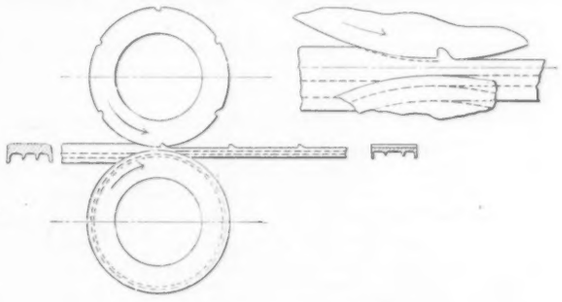


Fig. 6.—Rolling McKee Tie Plates.

is laborious hand work, which Germany and some of the other continental countries with their cheap labor are especially fitted to handle. American mills are specialized mills, and they are almost all striving for tonnage. It is difficult for some people not in the business to understand why a mill should want $5 to $10 extra per ton for some special section, besides making the customer pay for the cost of the rolls. The writer's own experience has been that very little money can be made on a small order which demands a special rolling, even if the section is a standard one. The fixed charges, the delays due to setting the rolls and getting the order started raise the cost in a surprising manner. On the other hand, give a rolling mill to-day a *bona fide* order for 5000 to 10,000 tons of even a very difficult and unusual section there are mills so equipped that they will be glad to take it at a very reasonable price, expecting to get their cost minimized on account of the size of the order.

**Early Experience with Tie Plates.**

When first interested in the manufacture of tie plates the writer noticed that there were two main types of these of rolled steel—one with the flanges on the bottom and the other with a shoulder on the top to take the thrust of the flange of the rail. Plates without either the flanges or the shoulder were seldom used, and it was evident that a large number of the tie plate users desired both the flanges and the shoulder, but being unable to get both in a rolled section, took their choice—some the shoulder, others the flanges. This naturally led to a study of the proposition to see if there was not a fair chance, at least, of being able to roll a plate with both the shoulder and the flanges. However, a number of reasons were given why this could not be done. One was that it would be impossible to reduce the section enough

in one pass to get such a shoulder as was required. Another was that the roll itself would "spall" at the shoulder. The third was that the reduction in the body of the plate would be much more than it would be possible to put on the flanges, thus causing the flanges to break.

We experimented only a short time before we were convinced that we would be able to meet the demands of the engineers; but in order to do this it was necessary to do what all our friends in the rolling mill business had told us was impossible. We rolled tie plates ⅜ in. thick with a ⅜-in. perpendicular shoulder, and in order to do this it is evident, even to the casual observer, that it is necessary to reduce the section by over 50 per cent. in the finishing pass. In practice this reduction is as much as 60 to 70 per cent. To a mill man used to only 10 to 20 per cent. reduction in the finishing pass this looked impossible. There were found in practice two troubles which bothered us. One was the irregularities between the shoulders—that is, when rolling a bar of plates that was supposed to be 8 in. between the shoulders if the top and the bottom rolls were not properly pitched and all other conditions were not perfect there would be a slip in the rolling, so that one roll and then the other seemed to govern the speed of the piece. Again the the reductions are so excessive that at times when a new smooth roll is put in the mill the speed of the piece will no longer be governed by the peripheral speed of the rolls, with the result that some plates are only half of the length they should be. As knowledge of these conditions has been gained it has been possible to keep these variations within reasonable limits. Another trouble was from the piece buckling as it left the rolls.

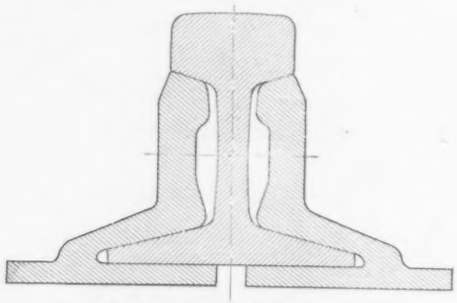


Fig. 7.—Continuous Rail Joint.

This seems to be caused by the difference in the reduction on the bar at the shoulder and at other points along the bar. As it is absolutely necessary that the foot of the rail should have a good bearing in front of the shoulder, at first we straightened every plate. It then occurred to us that as the place a tie plate usually failed was at the shoulder it would be well to cut away the top roll, as shown by the dotted line in Fig. 6. This left the plate flat on the top surface and with a swell or reinforcement on the bottom side. In this way and at the same time we were enabled to get around our difficulty and give the railroad engineers the plates reinforced at their weakest point. In rolling sections of this kind it is, of course, necessary to make the controlling circumference of the rolls a multiple of the length you desire in the hot tie plates. This is not as serious a matter in rolling tie plates as it is in the rolling of reinforced splice bars for rail joints. The length of a rail joint splice bar is such that it is hard always to get a roll of the correct diameter to accommodate the lengths required.

Rail joint splice bars have demanded considerable rolling mill ingenuity. The continuous rail joint (Fig. 7) is rolled with flanges turned out, and in the last pass it has been the customary practice in some mills to bend it into final shape, while in other mills it is bent into its final shape after it has been cut to length.

We have been requested many times to roll tie plates and similar products which had projections or grooves which were not in the direction of the rolling, and when the rolls for such sections could not be commercially machined by any process with which we are acquainted; yet in a number of instances we have found other mills offering to roll such sections. This mistake is often made by the person looking at the section desired and figuring out how the rolls could be fashioned without stopping to consider fully that the rolls are really the matrix for the section to be formed.

Two types of such plates are shown in Fig. 8. The plate with the circular flange on the bottom is such that

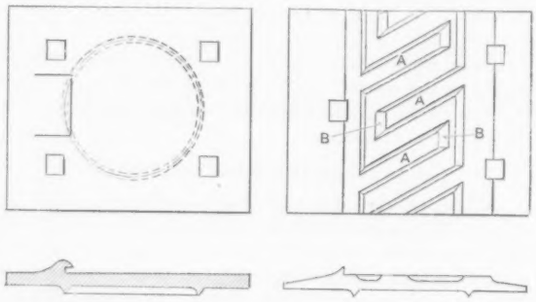



Fig. 8.—Tie Plates that Are Not Commercial Propositions for the Mills.

it would be very hard to mill the rolls, and when this is done it would, in the opinion of the writer, be impossible to develop this flange ⅜ in. long at the different points. Again the top side shows a shoulder which is very thick at the base, but which does not extend clear across the plate. It would be necessary to roll this clear across the plate and then cut it off through its thick portion.

The plate with the corrugated top can be made, but the rolls cannot be milled to the form required. They would have to be hand chipped in a number of places—that is, the bearing surfaces A A, which are the raised portions on the plate, are the depressions which must be milled out or cut into the rolls. The plates in question show sharp angles at the line A. This would naturally have a radius of at least 1 in. on account of the diameter of the milling cutter, and the corner would have to be chipped out.

What can be done with steel largely depends on the quality of the material which is used and the way it is treated. Many times material is used because it is convenient, although it is known to be unfit for the purpose. Some tie plate manufacturers are rolling tie plates from scrap. Such methods at best can produce only a questionable result, as it is impossible to get a homogeneous product.

For a number of years we have been asked to roll a tie plate as shown in Fig. 9, and have always said it was not a commercial proposition. The reason for saying this was that only a small tonnage was in sight, and the

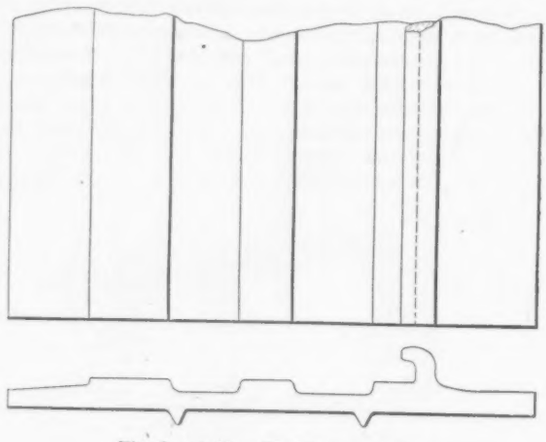


Fig. 9.—A New Tie Plate Section.

proportionate cost for special equipment and experimental work would be excessive. Now the matter is up again with prospects of a large tonnage, and we are ready to roll the plate, believing that we can put it on the market in large quantities at a price at which there will be a demand for it.

Rolled sections must always compete with cast ones.

This is usually not hard to do, as they can always be rolled, if at all, at prices below that at which steel or good malleable castings can be made. When rolled sections are bought it is very easy to make a few tests and be assured that practically every piece will come within the range of these tests.

## July Exports and Imports of Iron and Steel.

Exports of iron and steel have lately been decreasing while imports have been increasing, according to the July report of the Bureau of Statistics of the Department of Commerce and Labor. The value of the total exports of iron and steel and manufactures thereof, not including ore, in July was $11,866,772, against $13,779,736 in June. The total value of the same class of imports in July was $2,903,235, against $2,461,910 in June .

The exports of commodities for which quantities are given show a sharp decline. The total exported in July was 100,681 gross tons, against 114,751 tons in June, 109,977 tons in May, 100,904 tons in April, 94,523 tons in March, 84,860 tons in February and 70,085 tons in January. It will thus be seen that the continuous increase in such exports which had marked the course of this trade for the whole of the first half of the year has been checked. The details of the exports of these commodities for July and for the seven months ending with July are as follows:

*Exports of Iron and Steel.*

| | July. | | Seven months. | |
|---|---|---|---|---|
| | 1909. | 1908. | 1909. | 1908. |
| | Gross tons. | Gross tons. | Gross tons. | Gross tons. |
| Pig iron | 7,685 | 2,624 | 31,612 | 23,069 |
| Scrap | 2,570 | 1,269 | 21,322 | 12,825 |
| Bar iron | 992 | 533 | 8,001 | 4,141 |
| Wire rods | 589 | 253 | 9,391 | 3,751 |
| Steel bars | 6,691 | 2,690 | 38,609 | 25,823 |
| Billets, blooms, &c. | 13,971 | 8,465 | 74,810 | 72,150 |
| Hoop, band, &c. | 135 | 134 | 1,723 | 2,614 |
| Steel rails | 18,973 | 28,203 | 139,567 | 111,179 |
| Iron sheets and plates | 4,675 | 4,491 | 38,627 | 23,885 |
| Steel sheets and plates | 7,352 | 4,908 | 53,292 | 32,510 |
| Tin and terne plates | 1,267 | 54 | 5,597 | 11,167 |
| Structural iron and steel | 8,090 | 10,657 | 53,706 | 71,501 |
| Barb wire | 7,068 | 3,792 | 39,649 | 3,792 |
| Wire | 7,135 | 5,870 | 50,618 | 77,510 |
| Cut nails | 1,021 | 796 | 5,384 | 4,167 |
| Wire nails | 1,024 | 1,648 | 16,126 | 16,477 |
| All other nails, including tacks | 683 | 306 | 4,279 | 2,610 |
| Pipes and fittings | 10,760 | 10,103 | 83,276 | 67,538 |
| Totals | 100,681 | 86,796 | 675,589 | 566,709 |

The imports of commodities for which quantities are given reached a total of 29,136 gross tons in July, against 19,402 tons in June, 18,352 tons in May, 17,772 tons in April, 20,714 tons in March, 19,418 tons in February and 19,782 tons in January. It thus appears that the July imports were in excess of those of any preceding month of this year. The most important increase occurred in pig iron, of which 17,899 tons were imported in July, against 10,623 tons in June. The details of imports of this class of products for July and for the seven months ending with July are as follows:

*Imports of Iron and Steel.*

| | July. | | Seven months. | |
|---|---|---|---|---|
| | 1909. | 1908. | 1909. | 1908. |
| | Gross tons. | Gross tons. | Gross tons. | Gross tons. |
| Pig iron | 17,899 | 5,293 | 76,800 | 51,741 |
| Scrap | 2 | 844 | 2,252 | 3,002 |
| Bar iron | 1,418 | 1,397 | 8,564 | 13,344 |
| Rails | .... | 203 | 380 | 1,010 |
| Billets, bars and steel in forms n.e.s. | 2,712 | 690 | 9,084 | 5,647 |
| Sheets and plates | 304 | 236 | 1,944 | 1,336 |
| Tin and terne plates | 5,161 | 8,242 | 34,971 | 44,171 |
| Wire rods | 681 | 869 | 6,368 | 6,406 |
| Structural iron and steel | 959 | 548 | 3,649 | 1,387 |
| Totals | 29,136 | 18,322 | 144,012 | 128,044 |

The imports of iron ore in July were 172,316 gross tons, against 124,714 tons in June, 97,393 tons in May, 74,782 tons in April, 108,676 tons in March, 61,749 tons in February and 105,233 tons in January. Of the July imports, 85,960 tons came from Cuba, which is at the rate of over 1,000,000 tons a year.

The total imports of iron ore for the seven months ending with July were 744,803 gross tons, against 377,833 tons in the corresponding period of last year and 726,432 tons in the same months of 1907.

The total value of the exports of iron and steel and manufactures thereof, not including ore, in the seven months ending with July, was $86,819,465, against $93,200,401 in the corresponding period of last year. The imports in the same periods were, respectively, $15,597,523 and $11,993,195.

## Machine Molded Ingot Molds.

E. H. Mumford, Philadelphia, gives the following details in the *American Machinist* on the production of ingot mold cores on a jolt ramming machine:

Something less than a year ago, when designing and furnishing molding machines for making molds for steel ingots, an expert of one of our largest steel works remarked that while the machines we were offering for making the outside of molds were satisfactory, it was the inside of the mold, the part which shaped the liquid steel into the ingot for rolling, that most concerned them. This led, last December, to an experiment in which one of our 10-in. jolt ramming machines was loaded to more than twice its capacity and served with air at 140 lb. pressure per square inch. The first core was successfully jolt rammed on this for a standard ingot mold which, including the print, measured 7 ft. in hight and 31½ x 28½ in. at its base. This core was rammed 82 blows on the small machine. Immediately after this a 16-in. machine of proper capacity for this work was ordered, and since May 30 last it has been running without intermission and producing ingot mold cores of the above dimensions with two men at the rate of four cores an hour, whereas, previously, it had required five men to make 16 cores a day.

The important fact in this is that the cores produced, being rammed with absolute uniformity throughout their whole length, produced ingot molds with straight internal surfaces that were free from the waviness experienced from the necessary irregularities in ramming by hand, where the sand channel between the core barrel and the core box are as deep, narrow and obscure as in this work. It has yet to be learned how much is to be gained in the durability of the ingot molds or in the rolling operation on ingots that are smoother on their surfaces, owing to their being stripped from straighter molds than have been possible where the ingot mold cores have been hand rammed as heretofore. The works, however, in which machine molding methods are being adopted for the complete production of ingot molds anticipate great advantage in these directions.

**United Engineering Rolling Mill Contracts.**—The United Engineering & Foundry Company, Pittsburgh, has received a contract for a 14-in. continuous mill for the National Tube Company at Lorain, Ohio, and also for 12 stands of 28-in. hot mills and four stands of 24-in. cold mills for the Inland Steel Company, Chicago. The latter order includes squaring shears, sheet levelers and roll lathe equipment. The first shipment on the new Morgan continuous mill for the Cambria Steel Company, Johnstown, Pa., has been made by the United Engineering & Foundry Company. It will build an all steel shear, to cut 6 x 6 in. cold billets, for the Illinois Steel Company's plant at Milwaukee. This shear will be belt driven, motor to flywheel. The complete new warehouse equipment for the Scully Iron & Steel Company will also be built by this company.

**The Quebec Bridge.**—Plans for both a cantilever bridge and a suspension bridge are being made by the commission for the new bridge at Quebec, Canada. One of the piers of the bridge, which fell August 29, 1907, will be used, after being strengthened, and a new pier will be built on the other side of the river and 100 ft. further away from shore than its predecessor. The central span will thus be 1715 ft. In the new cantilever design, instead of the original 1200 ft. width of maximum clearance, a clearance width of 600 ft. has been adopted. The clearance is 150 ft., as before.

# Special Steels.*

## Developments in Their Manufacture in Recent Years.

BY LEON GUILLET, PARIS.

Since the last Congress, held at Brussels, the manufacture of special steels has made interesting progress and has taken a perfectly definite course which it may be instructive to indicate. We may remark at the outset that, if we class steels according to their structure, as in the memoir presented to the last Congress, we see that at present pearlitic steels (those which display the same structure as ordinary carbon steels) are almost the only ones which are used as materials of construction. It is certain that the polyhedric steels (gamma iron steels containing much nickel and manganese) are losing every day in commercial importance, on account both of their high price and of their low elastic limit. They are, indeed, hardly applied except in very particular cases, when their high resistance to oxidation, their capability of withstanding the temperatures of superheated steam, or finally the expansion coefficients characteristic of some of them, are to be utilized. But their application in mechanical construction, on which certain metallurgists placed great hopes, has not become general. The Hadfield steel always finds interesting appreciation in cases where high resistance to shocks and to wear must be allied.

Disregarding tool steels and ball and ball bearing steel of carbide structure we only find one industrial kind of steel now—the pearlitic steels. Let us inquire into the actual tendencies in the maufacture of these products. The special pearlitic steels, approximately arranged as to their importance, are the nickel steels and the nickel-chrome steels; the vanadium steels, with or without nickel and chromium; the silicon steels (often called mangano-silicon steels); finally, more rarely, the tungsten steels. Whichever steels may be considered, the actual tendencies are the following:

### Increasing Tensile Strength.

1. Raising the mechanical strengths, as we are accustomed to define them. In this respect the introduction of vanadium is especially to be mentioned; but it is little utilized in Europe.

2. The simplification of the thermal treatment.

3. The creation of special types for parts exposed to friction.

In attempting to raise the mechanical strength—that is to say, to produce steels characterized by the highest breaking strength and the highest elastic limit without being too fragile—we have been led to the production of more and more complex steels, containing often three elements which are foreign to ordinary steel. We have in this connection to distinguish two important points.

The steels which give interesting values, when rough forged or, better, when annealed, suffer from a grave disadvantage. If they possess high elastic limits they are very difficult to machine. Those steels on the contrary which, in the annealed condition, have medium mechanical strength and which by an appropriate, sometimes very simple, thermal treatment can be transformed into high strength steels, are of great interest because, worked in the annealed state, they do not require more than a tempering after treatment. Let us look at the extreme values we can obtain.

Some time ago I described a nickel-silicon steel which gave extraordinary values. The composition was: C., 0.221; Ni., 12; Si., 1.78; Mn., 0.112; S., 0.011; P., 0.005.

Annealed at 900 degrees it yielded the following figures: R = 170, E = 141.1, A per cent. = 9, S′ = 42.9, impact = 5, (R represents strength; E, elastic limit; A, elongation, and S′, elongation + contraction.) After hardening at 825 degrees in water of 20 degrees: R = 202.8, E = 138.3, A per cent. = 4, S′ = 0, impact = 10. But this steel is as such martensitic, very difficult to work without treatment. We do not believe that it has any industrial future.

### NICKEL, CHROME AND VANADIUM ALLOYS.

There are some other industrial types belonging to the category of steels which in their normal conditions are easy to manage and which by suitable treatment acquire notworthy properties.

1. *Nickel-Vanadium Steels.*—Composition: C., 0.200; Ni., 7; V., 0.2; Mn., 0.30. Properties when annealed: R = 65, E = 45, A = 20 per cent. Properties after hardening at 850 degrees C. in water: R = 140, E = 120, A = 10 per cent.

2. *Nickel-Chrome-Vanadium Steels.*—Composition: C., 0.450; Ni., 2.25; Cr., 0.60; V., 0.07; Mn., 0.28. Properties when annealed: R = 70, E = 50, A = 20 per cent., impact = 6. Properties after hardening at 800 degrees and tempering at 400 degrees: R = 150, E = 130, A = 6 per cent., impact = 11. It will be noted that the resistance to shock is greater after hardening than before hardening.

3. *Nickel-Chrome Steels.*—Composition: C., 0.173; Ni., 5.47; Cr., 0.18; Mn., 0.55; Si., 0.16. Properties when annealed: R = 61, E = 36, A = 21.5 per cent., S′ = 55, impact = 12. Properties after hardening at 850 degrees in oil: R = 130, E = 122, A = 5 per cent., S′ = 15, impact = 11.

We see that we may safely rely on a strength of 140 or 150 kg. per mm.² and an elastic limit of 120 kg. per mm.², accompanied by a resistance to shocks of 10 to 12 kgm. These figures characterize a steel which would not be fragile for a large number of applications, such as shafting or gearing.

### VANADIUM STEEL.

There is one tendency which has become extraordinarily general in the past year or two; it is the introduction of vanadium into steels. We have dwelt in several communications on the important part played by vanadium. This element augments the properties which we produce by quenching to a very considerable degree. Vanadium to the extent of 0.2 or 0.3 per cent. suffices to raise the breaking strength and the elastic limit after quenching considerably, without sensibly modifying the properties of the annealed metal. Chromium and silicon act in the same way, but they also introduce fragility and they modify the properties of the annealed metal much more than vanadium does. It should also be pointed out that vanadium has received much more attention in England and particularly in America than in France. Very satisfactory results have been realized in the production of armor plates, springs, matrices, &c., and vanadium steels are quite an industrial product.

### Simplifying Heat Treatment.

The second point aimed at in the improvement of the manufacture of special steels concerns the simplification of the thermal treatment. This is a most important feature. Most works are not equipped for a precise treatment which comprises quenching at a definite temperature and tempering at some precise temperature, considering that the latter process has to be carried out as a rule at low temperatures ranging from 200 to 400 degrees and that a variation of 25 degrees will often materially alter the properties, especially as regards friction. Metallurgists have therefore had every reason to simplify the thermal treatment, which is to impart certain qualities to the steel. The first step taken in this direction has been the suppression of the tempering process.

With this object in view attempts have been made to vary the composition of the steel in such a manner that the brittleness after quenching—desirable for some applications—should not require subsequent diminution by some tempering process. The nickel-vanadium steel of which we have already spoken is a notable example in point. It is quenched in water, and we need not much trouble about the exact temperature of the water. With the same object have been produced steels containing slight percentages of nickel, manganese and silicon, but rather rich in carbon. These steels need a simple quench-

* A paper read at the Fifth Congress of the International Association for Testing Materials, Copenhagen, Denmark, September 7-11, 1909.

ing in oil, at 800 or 900 degrees. (C., 0.45; Ni., 1.25; Mn., 1.14; Si., 1.28.)

STEELS WHICH MAY BE AIR QUENCHED.

It is, however, quite obvious that of all treatments ordinary air cooling is undoubtedly the simplest. Leaving out the rapid tool steels, with which we do not wish to deal in this note, air quenching is applied to a certain number of nickel steels, and we can predict which steels will lend themselves to this air quenching. We know that nickel steels are either pearlitic or martensitic or polyhedric. We likewise know that the martensitic structure is the structure of ordinary well quenched steels, and that the transition of one structure into the other depends upon the sum of (C + Ni) and upon the other elements as well. Manganese and chromium in particular exert an influence of the same character as nickel. The change from one structure to another is moreover not sudden.

There are steels which contain both pearlite and martensite. It will be sufficient to apply air cooling to render the structure all martensitic. It is therefore steels bordering upon the martensite steels which will take air quenching. But these steels are inconvenient in one respect. A slight change in their chemical constitution will send them over to the class of martensite steels which are very difficult to work. Here are some examples of steels which will take air quenching:

1. C., 0.75; Ni., 3.82; Cr., 1.28; Mn., 0.52; Si., 0.17. Annealed: R = 97; E = 76.8; A = 12 per cent., S′ = 40, impact = 30. Air quenched at 850 degree: R = 135, E = 132, A = 10 per cent., S′ = 20, impact = 8. (Brittleness less after than before quenching.)

2. C., 0.252; Ni., 5.43; Cr., 0.52; Mn., 0.33; Si., 0.22. Annealed: R = 76, E = 64.3; A = 18 per cent., S′ = 60.2, impact = 20. Air quenched at 850 degrees: R = 123, E = 105.4, A = 10 per cent., S′ = 48.5, impact = 12. Water quenceched at 850 degrees: R = 143.5, E = 128, A = 8 per cent., S′ = 42.3, impact = 10.

3. C., 0.366; Ni., 4.76; Cr., 0.92; Mn., 0.41. Annealed: R = 95 to 100, E = 80 to 85, A = 12 to 15 per cent., S′ = 55 to 60, impact = 12. (Figures given by manufacturer.) R = 143, E = 120, A = 7 per cent., S′ = 38.7, impact = 6.5. (Values we determined.) Quenched in air it should yield, according to the manufacturer: R = 159, E= 125, A = 8 per cent., S′ = 40.1, impact = 8.

This last mentioned steel exemplifies, in so far at least as my own experience goes, what I said above concerning decidedly martensitic steels. Those steels would evidently *a fortiori* lend themselves to water quenching. Indeed, their mechanical properties would be enhanced by this treatment. But the very simple air quenching will do quite well in many cases.

**Higher Carbons for Rubbing Surfaces.**

The third actual tendency noticeable in the manufacture of special steels concerns the augmentation in carbon percentage in the case of steels for rubbing surfaces. Broadly speaking, carbon is certainly the best agent which will impart mineralogical hardness. Chromium has the same effect, but it cannot equal carbon. For certain parts, where brittleness is less to be feared, the carbon percentage is increased as it seems to be correlated with wear by friction. As examples I give the compositions of two steels which are made by the same French firm:

*Type* 1.—C., 0.330; Ni., 2.43; Cr., 0.42; Mn., 0.43; Si., 0.26.

*Type* 2.—C., 0.626; Ni., 2.6; Cr., 0.54; Mn., 0.22; Si., 0.32.

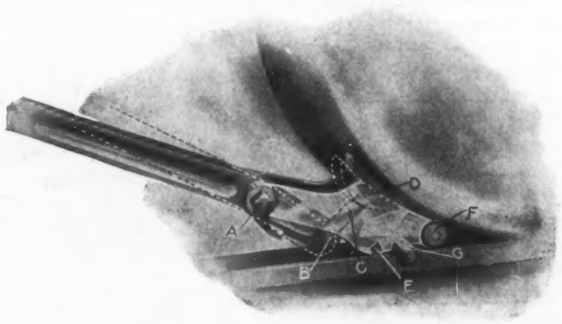
Personally I am not an advocate of high carbon percentages, and in practice—leaving apart the silicon steels, which may contain up to 0.60 per cent. of carbon—the metals which answer best are those containing at the highest 0.40 per cent. of carbon. In a good many instances it will indeed be advantageous to keep below this figure.

To sum up: The three years which have elapsed since the last congress have only justified the conclusions at which we arrived in the short note then presented. The manufacture of special steels for structural purposes turns more and more to the pearlitic steels, and among these the nickel chrome steels claim a position of increasing importance.

It cannot be said that new types of steels have been created since the Brussels congress. Yet certain steels which were already made at that period, but were not widely applied, have had a great commercial development. These are the simple or complex vanadium steels, which have been gaining ground in America above all other countries, and the nickel steels, with or without chromium, which border upon the martensite steels and take air quenching.

## The Atkins AAA Car Mover.

A device which, it is claimed, will move cars more rapidly and with less effort than any other hand operated contrivance is the AAA car mover, made by E. C. Atkins & Co., Indianapolis, Ind. It is the invention of the patentee of a former popular mover, and is the outcome of long study and experience of the problems involved. It is expected to appeal particularly to manufacturers who have switching facilities, as it will enable them to readily handle both full and empty cars easily and rapidly.




The New A A A Car Mover Made by E. C. Atkins & Co., Indianapolis, Ind.

As may be seen in the illustration, the device is constructed on an entirely new principle. The roller F permits the mover to slide easily along the rail and the hard steel key G (with four corners which may be changed when desired) clinches the top of the rail and prevents slipping. The link C is fastened to the shoe D, so that upon pressure upon the handle the shoe is moved against the wheel with an upward and forward pressure and without any friction whatever upon the car wheel. The pivots A and B are the only points where friction occurs, and as these parts may be easily lubricated there is virtually no appreciable friction. The only pressure upon the car wheel is the upward and forward motion rather than a prying underneath the wheel, as in the case of former car movers. Atkins AAA car movers are carried in stock for immediate delivery at the company's main office and factory and all of the branch offices.

**Graphite Production in 1908.**—The United States Geological Survey reports that the production of natural graphite in the United States in 1908 fell off more than nine-tenths as compared with 1907. This great decrease was chiefly due to the total suspension of operations by certain Georgia firms which had been mining a graphitic schist for use in fertilizers. This class of graphite, however, was of comparatively little value, and the reduction in total value due to its cessation amounted to only about one-third—from $296,970 to $208,090. In 1908, as in 1907, New York ranked first, Alabama second and Pennsylvania third in both quantity and value of the natural graphite produced. A part of the reduction in natural graphite was made up by the artificial product, which increased in value from $481,239 to $502,667. Artificial graphite is made by a single firm, located at Niagara Falls, which uses an electric process in its manufacture.

# Grinding Sparks of Steel.*

## How They May Become a Basis of Classification.

BY MAX BERMANN, BUDAPEST.

In the grinding of iron materials by means of emery wheels grinding sparks are given off. According to their dimensions and their edges and angles of section, as also to the pressure at the surface of contact between the metal and the wheel, the sharp edges of the emery crystals detach chips of different, but certainly very small, sizes at a very high velocity. The mechanical work hereby transformed into heat raises the temperature of the chip to a red heat. The glowing chip is thrown off with the peripheral velocity of the emery wheel and forms the grinding spark. The crystals thus crumbled from the emery wheel are also thrown off, but they are not red hot and cannot therefore be mistaken for the sparks.

The path described by the spark from its origin to its disappearance (the extinction of the spark being equivalent to its disappearance) forms a line of light which we shall call the spark ray. The length of the spark ray varies considerably, and depends upon the size and therefore upon the mass of the spark. The larger sparks fly to greater distances, the smaller ones to distances of a few centimeters or a few millimeters. The size of the sparks depends principally upon the size of grain of the emery, the speed of cutting, the nature of the metal to be ground and the pressure with which the wheel is made to bear against the metal. The initial temperature of the sparks is influenced principally by the cutting power and cutting speed of the emery wheel, and in a minor degree by the nature of the iron material to be ground. The influence of the emery wheel, however, by far outweighs that of the quality of the iron.

### Spark Picture of Soft Steel.

If we consider a spark ray of a soft steel (wrought iron), say one of the longer rays, we see that it forms a quite fair line of light, the end of which assumes the form of an extended drop, the point of the drop lying toward the front in the direction of the flight of the spark. The heat of this drop formation varies between a bright red and a white glow, and on closer observation we find that its pointed dark red end is extended so as to form a second much smaller drop. At the point at which the first drop formation is broadest—*i. e.*, where it is of a white heat—it branches out, pointed prickle-like lines rushing out of it in every direction with an explosion-like appearance. The pointed branching lines have, in the lateral projection, a forked appearance, while in the direction of their flight they look as if rushing from a very brightly glancing knot shooting forward in an explosion-like manner and disappearing in a moment.

This explosion-like appearance and articulation of the spark ray is different in the cases of different kinds of iron, and is in fact characteristic for each. We shall give this phenomenon, which is the characteristic form of the articulation, the name of the spark picture. The spark picture of the carbon steel is the tuft of prickle-like lines, Fig. 1.

With a percentage of carbon of 0.07 to 0.08 the number of these lines is from two to three, and these appear to start from different points of the brightly shining drop formation. With an increase of the percentage of carbon the number of the branching lines also increases. With 0.25 to 0.27 per cent. of carbon a crowd of prickle lines appear, and they spring from a common point of the drop formation. With a still larger percentage of carbon the prickle lines cover a correspondingly large part of the drop formation with a proportionately greater closeness of crowding.

Fig. 1.—Spark Sheaf of a Hard Carbon Steel.

Fig. 2.—Spark Sheaf of Tool Steel Rich in Manganese.

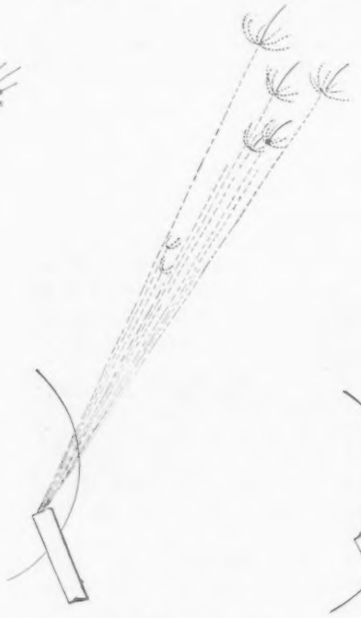


Fig. 3.—Spark Sheaf of Special Steel Rich in Wolfram.

Fig. 4.—Spark Sheaf of Molybdenum Rapid Steel.

The number of the prickle lines in the spark formation is proportional to the percentages of carbon contained by the different kinds of steel, so that conclusions may be formed from them in regard to the latter.

In the case of crucible cast steel the spark picture resembles the branch of a blossom and the individual branching lines have a lilac-like form. This enables the crucible cast steel to be distinguished from other kinds, as, for instance, from Siemens-Martin steel, by means of the spark test.

### Spark Pictures of Alloy Steels.

The spark picture of steel which contains manganese is so characteristic that it is almost impossible to mistake it for that of any other kind of steel. The ends of the individual branching lines in this case are no longer pointed, but in each instance show a secondary explosion-like phenomenon, shorter lines collecting, like leaves around a common central point, Fig. 2.

This leafy end of the branching lines in the spark picture characterizes the manganic steel. The number and the closeness of the primary branching lines springing from the drop formation are again the greater, the larger the percentage of the carbon in the steel. The extent and the shape of the spreading ends of the primary branching lines appear to stand in connection with the percentage of manganese contained in the material.

Not less characteristic and thereby surprisingly easy to recognize is the spark picture of steel containing wol-

* A paper read at the Copenhagen Congress of the International Society for Testing Materials, September 7-11, 1909.

fram, Fig. 3. The spark rays are dark red, hatch stroked lines, the ends of which show no spark picture when the emery wheel is not sufficiently sharp and the pressure between wheel and steel is small, and only the last little stroke in the spark ray, which has a broader and more brightly glowing appearance, points to the beginning of a spark picture.

If we cause the steel to bear with a greater pressure against the emery wheel the drop formation appears at the end of the spark rays, and out of it spring the branching lines in an explosion-like manner. The ends of these lines, however, are neither pointed nor leaflike, but take the forms of little shining pinhead-like balls. Beside the little balls the branch lines are scarcely visible, and the appearance of the whole is as if the shining balls were thrown directly out of the drop formation.

The spark sheaf (the combination of the spark rays and spark pictures) of the chrome-wolfram steel (high speed steel) is distinguished from that of the wolfram steel by the circumstance that two kinds of ray appear—viz., very thin dark red and thicker brick-red ones, which are absent in wolfram steel. The spark pictures of the high speed steel consist solely of short curved drop formations. In many kinds, such, for instance, as Böhler Rapid, Mark P 11, solitary long needle shaped lines with clubbed ends shooting out from a central point also make their appearance. These may be taken to show one or other of the subsidiary alloy metals, such as are made use of in the manufacture of high speed steels. The drop formations of the spark sheaf have a strikingly higher speed of flight, and look as if they were suddenly thrown to a greater distance in the direction of their flight by an internal force. In Fig. 4 is shown the spark picture of a molybdenum steel.

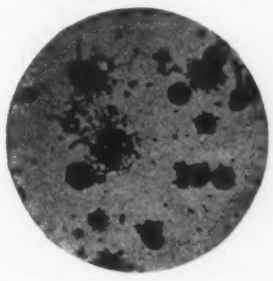


Fig. 5.—Extinct Sparks of Nickel Iron Adhering to the Glass Plate.

Fig. 6.—Extinct Unfused Sparks of Nickel Iron Collected on Glass Plate.

The spark picture of nickeliferous steel is completely identical with that of carbon steel with corresponding percentage of carbon and reduced percentage of nickel (3 per cent. Ni). In case of a larger percentage of nickel (nickel steel), however, the nickel steel can very readily be recognized by the aid of the spark test, because in connection with it the spark pictures only show themselves in a sporadic fashion here and there, whereas in the case of carbon steel they occur in close proximity and in close succession to one another.

In accordance with its composition, and more especially with its percentage of carbon and manganese, cast iron gives spark pictures which differ from one another. The drop formation is in every case present. The branching lines range themselves very closely along the brightly shining part and, in accordance with the relative percentage of manganese, show ends of more blunted or more leafy appearance.

### Significance of the Sparks.

On the basis of this description of the characteristic spark formations we are now able to recognize the different kinds of iron and steel, to distinguish them one from another, eventually to establish their identity, and, by dint of special practice with analyzed material and the use of standards, to determine the exact percentage of amalgamated carbon in each kind of iron. Proficiency in the judgment of the spark formation can be much more easily attained when an acceptable explanation of the spark pictures is forthcoming. The facts and indications which provided me with a basis for this explanation are the following:

1. At a certain point in its line of flight the red hot spark assumes a yellow heat; it then reaches a white heat, thereby transforming itself in an explosion-like manner into the spark picture.

2. At the moment of its explosion-like transformation the spark is in the fluid state.

In regard to 1, a proof need hardly be given. The fluid condition of the spark, however, is not apparent without closer investigation. If we introduce a plate of glass at right angles to the line of flight of the sheaf of sparks it will become covered with extinct sparks. The microscopical examination shows that part of the sparks reach the glass plate in an already fluid condition and crystallize there in the most diverse relievo forms, or splash asunder, Fig. 5, while another part adheres to it only loosely and can be easily rubbed off. This latter kind consists of chips of various forms corresponding with the various cutting and bearing angles of the emery crystals, Fig. 6.

A further proof for the fusion of the sparks is afforded us by the examination of the grinding dust which has fallen unhindered to the ground (a mixture of emery crystals and extinct sparks). By the aid even of an ordinary magnifying glass we see, side by side with chips of iron, little smooth, shining black and blue balls, which unquestionably point to a chill in a fluid condition.

### A Theory of the Spark Phenomena.

And now for an explanation of the facts:

The increase of heat of the spark (where an extinction due to rapid cooling would more reasonably have been expected) was caused by an internal source of heat, represented on the one hand by the transformation heat of the kind of carbon in question at the critical temperature produced by cooling, and on the other by the combustion heat of the transformed carbon which in the *status nascens* suddenly burns. The heat of oxidation of the exterior surface of the mass of sparks acts in opposition to the too rapid cooling of the spark. The quantity of oxygen necessary for the combustion of the carbon is now supplied by the crust of black oxide of iron which, up to the point of critical temperature, had been formed.

The heat of combustion of the carbon constituent provides the quantity of heat necessary for the fusion of the mass of sparks. As a matter of fact, however, this heat is not sufficient to melt the whole mass, because the amount of the carbon is too small. A melting of the spark takes place when the mass of the unoxidized core within the oxidized iron crust is small enough to be melted by the quantity of heat available. In this case the combustion gases of the amalgamated carbon burst the outer crust of the spark mass and thrust out the fluid contents in the direction of the primary branching lines. The silicon and phosphorus therein contained also burn at the melting heat of the iron and raise the temperature of the fluid mass. From this explanation it follows that the size of the fusible spark increases with the percentage of amalgamated carbon, while the quantity of the fluid core and the tension of the combustion gases are correspondingly greater and the branching lines more numerous.

We now have the explanation of the circumstance that the percentage of assimilated carbon bears definite relation to the number of the branching lines in the spark picture, and are also in possession of the proof of the fact that not all sparks give spark pictures.

It must command attention that in spite of the explosion-like articulation of the spark picture at one point of the line of flight, the branching lines often appear at different points of the drop formation. I find the explanation of this in the difference of the speed along the line of flight, and at right angles to it, after the bursting of the spark crust.*

### Applications of the Spark Test.

The practical applicability of the spark test is manifold. The most important instances of it may be shortly given as follows:

1. The classification of the different kinds of iron in

* In regard to the other spark pictures and details I must, in view of the limited space at disposal, refer to my article, "Die Funken als Erkennungszeichen der Stahlsorten" ("The Sparks as Marks of Recognition of the Different Kinds of Steel"), which appeared in the *Zeitschrift des Vereins deutscher Ingenieure*, No. 5, Vol. 53, 1909.

accordance with "percentage of carbon" and "principal alloy metal."

The ends of rods which may eventually have been wrongly arranged in the storing rooms of the iron working industries are made to bear against the revolving emery wheel. The shape of the spark picture gives unerring indication of the kind of iron to which the rod in question belongs. Pointed branching lines in the spark picture denote carbon steel—*e. g.*, Siemens-Martin steel: leafy ends of the branching lines a manganic steel (Siemens-Martin steel with larger percentage of carbon). Spark pictures with a blossom branchlike arrangement indicate ordinary tool steel; dark red stroked spark rays and shining points and little balls thrown out of the drop formation, wolfram steel; two different kinds of spark rays of dark red and brick red color, respectively, with short unarticulated drop formation, high speed steel with chrome and wolfram as alloy elements; when explosion-like articulation is present, a secondary alloy metal (molybdenum, vanadium or titanium) is in question.

2. The spark test is so sensitive that it gives strikingly clear indication of a difference of 0.01 per cent. of carbon, and it accordingly offers a very simple and rapid check on the chemical analysis in regard to the amalgamated carbon in steel, and also forms a suitable check on the Siemens-Martin process (in place of the forge test), particularly when analyzed standards are made use of for comparison. The assay sample is chilled and the sparks compared with those of the standard. The carbon in the charge is then increased or lessened, according to the differences which show themselves.

3. In the purchase of different kinds of iron the spark test supplies a sure means of excluding material which does not comply with the conditions. When a suitable sample is available, it is only necessary for the testing official to satisfy himself of its identity with the material offered by comparison of the spark pictures. The material for quality tests is chosen from charges which give spark pictures identical with those of the samples, and from those of which the spark pictures show considerable difference. At the test these latter will show themselves as not in accordance with the conditions.

4. The spark test supplies a very sensitive means of establishing with certainty any differences there may be in the chemical composition at different points in the iron product, and also in finished objects and structural parts.

5. The spark sheaf and the spark pictures provide the possibility of at once determining whether a cast iron is gray or white, and also of distinguishing shades of difference in the individual varieties. Fine dark red spark rays, spark pictures here and there, and lines collecting round the drop formation like a net, formed by the leaflike articulation lines, denote black or very dark gray cast iron; spark pictures corresponding with manganic steel, gray cast iron. The netlike lines retreat more and more with the increase of the assimilated carbon, and with light gray cast iron they disappear altogether.

6. In shop work the spark test, when once introduced, is not easily done without. In the hardening room counsel is taken with the spark prior to the hardening of the tools (which are to-day made of steel of the most varied kinds), to avoid the occurrence of gross mistakes in the hardening temperature applied. The wire for the manufacture of different spiral springs is likewise examined with the emery wheel, to see whether it has the degree of hardness suitable to the purpose in view.

In the forge the spark is applied to the distinction of good malleable wrought iron from such as is difficult to weld, &c.

The importance of making a process of such simplicity available for general practical purposes may perhaps repay the trouble of closer attention. It affords me satisfaction to have done my part toward such a consummation.

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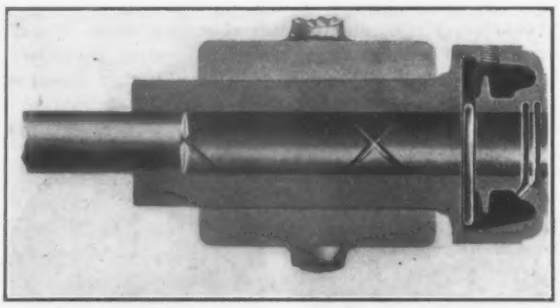
## The Brown Ring Oiler.

A ring oiling bushing for loose pulleys and clutches particularly intended for use in rolling mills, sawmills and machine shops, or anywhere that trouble is experienced with these devices, and it is desired to effect a saving in oil, is made by the Brown Engineering Company, 123 North Third street, Reading, Pa. Particularly of advantage is the long time that this bushing will go without having its oil supply replenished. Once in from four to six weeks is usually sufficient, whereas the ordinary loose pulley requires attention daily, or at least semiweekly. It is also claimed that this bushing will save over 75 per cent. of the oil ordinarily required. These bushings are operated in some cases at speeds as high as 2000 rev. per min., and are reported to be giving perfect satisfaction. They are recommended for any class of service up to the above mentioned speed. With their use the loose pulley of the ordinary type is converted into one with a ring oiling journal, and the character of the service it gives will be equivalent to that of a ring oiling hanger, it is claimed, in every respect.

The construction of the bushing may be seen in the illustration, from which it will be noticed that the oiler is sealed and consequently no evaporation can take place



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and no grit can enter—features which render the device economical and suitable for use under the worst conditions, as in plants where dust and dirt are present in great quantities. The ring rests directly on the shaft. The reservoir is filled from a plug on the top up to the lever of the shaft, but no more oil can be put in, as an overflow is provided. When the pulley revolves the oil is carried around and forms a coating on the inside surface of the reservoir. When a speed of approximately 30 rev. per min. is reached the ring is revolved by the action of the revolving oil and floods the shaft with oil for that or any higher allowable speed.

A feature of advantage in heavy pulleys and clutches is that the ring is turned and lubricates whether the shaft revolves in a stationary pulley or the pulley revolves on a stationary shaft. In either event copious lubrication is afforded. The bushings are made with outside diameters of 2 7-16, 2 15-16 and 3 7-16 in. in lengths of 4¼ to 12¼ in. and with all of the standard bores from 1 3-16 in. to 2 15-16 in. Other outside diameters and other than standard bores may be had on special order.

The value of the Brown ring oiler is particularly marked in plants which are already equipped with ring oiling hangers on the line shafting. When the loose pulleys and clutches have been provided with these ring oilers all of the transmission plant is uniform so far as the attention required is concerned. That is to say, a systematic refilling of all oil reservoirs, say one a month, is sufficient. A consequently large saving results in oil, power and time, and at the same time the danger of stoppages of machinery because of pulleys running dry is done away with.

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## A Difficult Steel Casting Job.

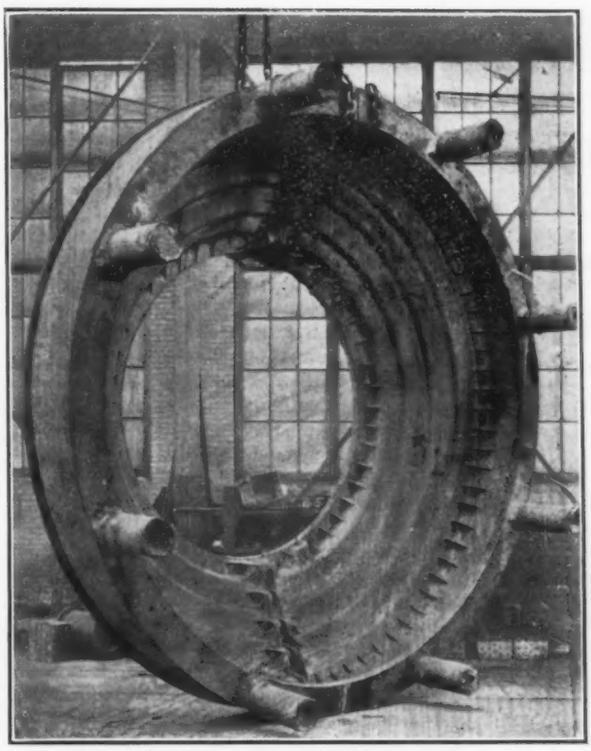
The removal of water from mines is often a serious problem, especially when the water is highly contaminated with acids and the volume to be handled is large. At some mines in the coal regions as much as 14 tons of water must be disposed of to each ton of coal hoisted. After exhaustive trials of pumps of various types an automatic skip hoist was installed at the Hampton shaft of the Delaware, Lackawanna & Western Railroad Company, at Scranton, Pa. This hoist, which was designed and built by the Wellman-Seaver-Morgan Company, Cleveland, Ohio, and was of a very special design, contained many interesting features.

From a foundryman's standpoint the drums are, perhaps, the most interesting parts of this hoist. They were two in number, made of basic open hearth steel. The specifications required that the sulphur and phosphorus should not be more than 0.04 per cent., and the tensile strength at least 60,000 lb. When the castings were made tests showed that the tensile strength was not less than 68,000 lb., and analysis of the metal showed the sulphur to be 0.02 and phosphorus 0.016 per cent.

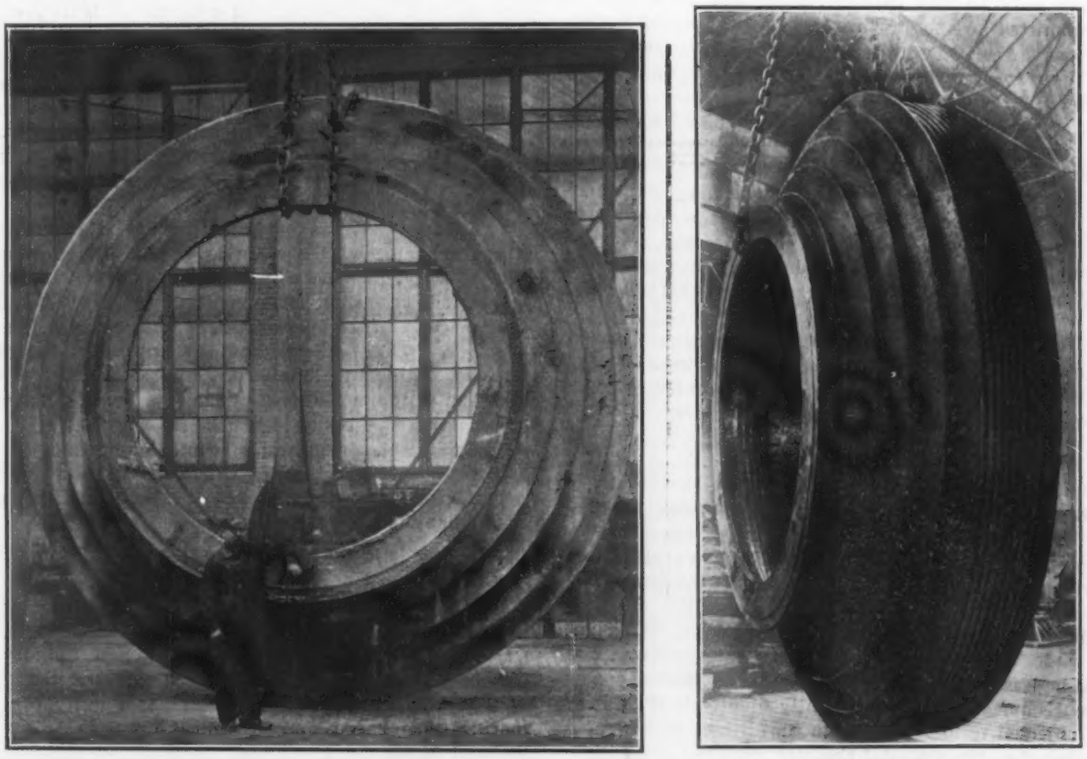
The drums were cylindro-conical in form, as may be seen in the three views herewith, for the purpose of securing a suitable acceleration of the rope, the large diameter being 16 ft. and the small diameter 10 ft. The total face width of each drum was 4 ft. 2 in., with 10 turned grooves on the cylindrical face and five cast grooves on the conical face, both for 2-in. rope. The thickness of the metal in the rough, before turning the grooves, on the cylindrical face was 2 in. and on the conical face 1½ in. beneath the cast grooves. The rough weight of each drum was 34,000 lb., and each casting was made in one piece, but afterwards split to facilitate handling, thus making four separate pieces for the two drums.

The molding of these castings was obviously rather difficult. For forming the cast grooves a center spindle was employed, having a variable pitch thread cut upon it of a length corresponding to the width of the conical portion of the drum face. To this was attached an A frame, with a horizontal arm at its base for attaching cutters to form the spiral groove. A ball bearing roller attached to the A frame and engaging with the thread on the spindle raised and lowered the frame by an ingenious train of gearing to provide the proper motion for the horizontal arm, the ratio of these motions being a 5-in. rise and a 9-in. extension of the cutter arm in one revolution. This same frame, omitting the gearing and rollers, was used for sweeping the cylindrical portion of the mold. The balance of the molding work was in accordance with ordinary practice. Largely on account of the size the entire piece of work was unusually difficult to handle. The cores with their arbors weighed 36 tons, and a load of 85 tons was required to hold the cores in position when pouring the molds.

The first pair of castings made proved perfectly sound, being free from mechanical defects and the metal analyzing above the requirements. This, together with the fact that the cast conical grooves merged into the cylindrical grooves with perfect smoothness, leads the builders to believe that they have accomplished a piece of work worthy of mention.



Rear of the Casting, Showing Sink Heads.



Front and Side Views of a Large Steel Cylindro-Conical Hoist Drum Made by the Wellman-Seaver-Morgan Company, Cleveland, Ohio.

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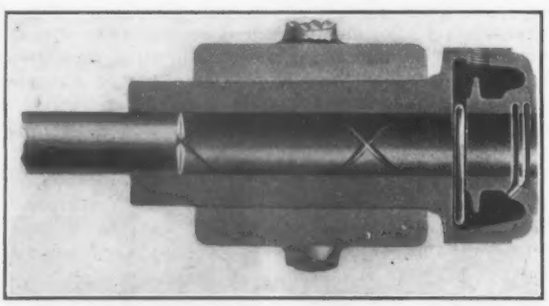

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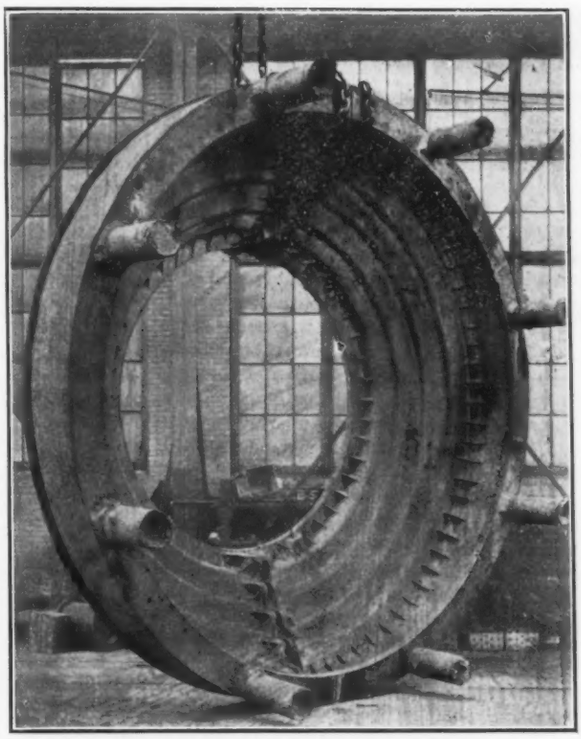
From a foundryman's standpoint the drums are, perhaps, the most interesting parts of this hoist. They were two in number, made of basic open hearth steel. The specifications required that the sulphur and phosphorus should not be more than 0.04 per cent., and the tensile strength at least 60,000 lb. When the castings were made tests showed that the tensile strength was not less than 68,000 lb., and analysis of the metal showed the sulphur to be 0.02 and phosphorus 0.016 per cent.

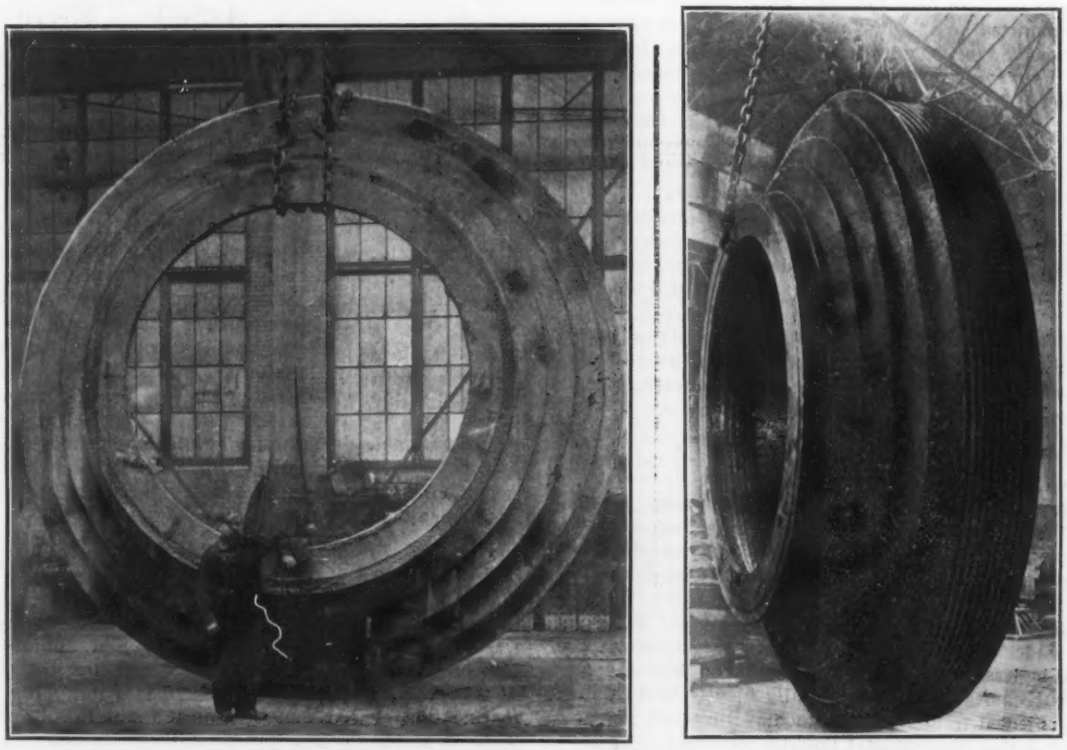
The drums were cylindro-conical in form, as may be seen in the three views herewith, for the purpose of securing a suitable acceleration of the rope, the large diameter being 16 ft. and the small diameter 10 ft. The total face width of each drum was 4 ft. 2 in., with 10 turned grooves on the cylindrical face and five cast grooves on the conical face, both for 2-in. rope. The thickness of the metal in the rough, before turning the grooves, on the cylindrical face was 2 in. and on the conical face 1½ in. beneath the cast grooves. The rough weight of each drum was 34,000 lb., and each casting was made in one piece, but afterwards split to facilitate handling, thus making four separate pieces for the two drums.

The molding of these castings was obviously rather difficult. For forming the cast grooves a center spindle was employed, having a variable pitch thread cut upon it of a length corresponding to the width of the conical portion of the drum face. To this was attached an A frame, with a horizontal arm at its base for attaching cutters to form the spiral groove. A ball bearing roller attached to the A frame and engaging with the thread on the spindle raised and lowered the frame by an ingenious train of gearing to provide the proper motion for the horizontal arm, the ratio of these motions being a 5-in. rise and a 9-in. extension of the cutter arm in one revolution. This same frame, omitting the gearing and rollers, was used for sweeping the cylindrical portion of the mold. The balance of the molding work was in accordance with ordinary practice. Largely on account of the size the entire piece of work was unusually difficult to handle. The cores with their arbors weighed 36 tons, and a load of 85 tons was required to hold the cores in position when pouring the molds.

The first pair of castings made proved perfectly sound, being free from mechanical defects and the metal analyzing above the requirements. This, together with the fact that the cast conical grooves merged into the cylindrical grooves with perfect smoothness, leads the builders to believe that they have accomplished a piece of work worthy of mention.



Rear of the Casting, Showing Sink Heads.



Front and Side Views of a Large Steel Cylindro-Conical Hoist Drum Made by the Wellman-Seaver-Morgan Company, Cleveland, Ohio.

# International Society For Testing Materials.

## Fifth Congress at Copenhagen, Denmark, September 7 to 11, 1909.

*(Special Correspondence.)*

COPENHAGEN, DENMARK, September 11, 1909.—Monday, September 6, the day previous to the opening of the congress of the International Society for Testing Materials, brought a large number of delegates to this city. About 900 had susbcribed to the congress and fully 700 are in attendance. A series of committee meetings was held on Monday, and reports were put in shape for presentation. The American members of the society in attendance are the following: Dr. Charles B. Dudley, Altoona, Pa.; Prof. Wm. K. Hatt, Lafayette, Ind.; Richard L. Humphrey, Washington, D. C.; Prof. Arthur N. Talbot, Urbana, Ill.; Walter Wood, Philadelphia; Wm. R. Webster, Philadelphia; Tinius Olsen, Philadelphia; L. H. Fry, Paris, technical representative in Europe of the Baldwin Locomotive Works; Prof. J. W. Richards, South Bethlehem, Pa., and Dr. Richard Moldenke, Watchung, N. J.

A very elaborate programme had been provided, but unless a member had received copies of the papers by mail before leaving home he had little chance to know of their contents, as they were not obtainable at the meeting.

The opening session was held in the great assembly hall of the university in the presence of all the members of the royal family. There was an imposing ceremony, the King and Queen of Denmark, the Crown Prince and Princess and the other Princesses leading a long procession of representatives of other governments. The students of the university sang a cantata, which was followed by an address of welcome in French by the Crown Prince. Next the president of the congress, Alexander Foss of Denmark, read his annual address in German. He discussed the work of the International Society and its bearing upon the peaceful progress of the nations. It was particularly gratifying to the American members who struggled at Budapest nearly 10 years ago to shape the policy of the International Society in the direction of specifications and away from simple testing methods only, to note that Mr. Foss held the society to be committed to the preparation of international specifications for all materials that could be so treated, as soon as the knowledge of each material made this possible.

After a rousing cheer consisting of nine "hochs" had been given the king and queen, business proceeded with the reading in English of a long paper on the development of the cement industry of Denmark, by Paul Larsen. After a concluding cantata by the students, the royal family left and the meeting adjourned. In the evening a brilliant reception was given the congress by the Danish Engineering Society at the Royal Shooting Club.

On the evening previous to the opening the members of the council of the society and their ladies (Dr. and Mrs. Dudley for the United States) were entertained at dinner by the king at the Amalienborg Palace.

### WEDNESDAY'S SESSION.

Section A, under the chairmanship of Director O. F. Busse, began the session on metals Wednesday morning with the report of Prof. Heyn on the "Progress of Metallography Since the Brussels Congress." It was discussed by Professor Le Chatelier, Mr. Stead and Drs. Rosenhain and Bendix. The discussion went into the colloidal transition state of carbon and iron compounds. The point was made that the micrographic constituents of iron should be lessened in number, as several of them go under different names and are practically identical. Professor Heyn objected to any changes in that direction and also suggested that the colloidal theories were not sufficiently conclusive to be accepted off-hand. The committee was, therefore, continued. In the discussion Mr. Stead mentioned that the eutectic for phosphorus-carbon iron was about 2 per cent. carbon, 7 per cent. phosphorus and the balance iron, and that it exhibited peculiar properties.

Next came the paper of Leon Guillet of Paris on "Special Steels," which was not discussed. [It is given elsewhere in this issue.]

#### International Specifications for Iron and Steel.

At the afternoon session Wm. R. Webster, Philadelphia, presented on behalf of International Committee No. 1 the respective specifications for iron and steel adopted by America, England and Germany. The data submitted as a basis for action included a report of the work done by Subcommittee 1a. This subcommittee held a meeting July 1, 1909, in London, the United States being represented by William R. Webster. A summary was submitted, as prepared by Chairman Rieppel, of the existing specifications for structural steel rails and fish plates in the United States, Germany and Great Britain, adopted respectively by the American Society for Testing Materials, the Deutscher Verband für die Materialprüfgen der Technik, and the British Engineering Standards Committee. It was decided that it would be inadvisable for the subcommittee at this time to recommend any material changes in the standard specifications as above submitted, as the conditions of manufacture and rolling mill practice vary so much in the different countries. It was decided to recommend conference with the three associations referred to above with the view to bringing the various specifications more in harmony; to confer with manufacturers direct, to induce them to roll trial orders of material under the conditions of specifications of other countries, to see how far these can be introduced for export orders; also to suggest that a standard drop testing machine for rails be adopted in each country, as has already been done in the United States, in order to make the tests comparative. It was also decided to report at the congress of 1912 single international specifications for each class of material, even if in some cases they may be partly in the form of alternative specifications for the same class of material. What the committee would like to secure agreement on is the following: 1. Material manufacture and test regulation. 2. Properties of material, as tensile strength, elongation, &c. 3. Admissible deviations from dimensions and weights.

Professor Martens offered a resolution to the effect that the thanks of the congress be given the committee for its work, that its conclusions be adopted in general and that it be instructed to continue the work of unification of iron and steel specifications and report at the next congress. The subject was discussed by Professors Schuele, Kirch and Belelubsky, and the result was the adoption of the motion, but not until after Mr. Robertson of England had called attention to the fact that only really national specifications would be considered; that is to say, specifications in which the interests of both manufacturer and engineer were combined and the whole adopted as the standard practice of the country.

#### Pig Iron and Cast Iron Pipe.

George Lloyd of England, secretary of the Iron and Steel Institute, presented a resolution on behalf of the Cast Iron side of Committee No. 1, in which attention was called to the growing specification of foundry pig iron by analysis, and the committee was directed to ascertain whether the time is not ripe to unify pig iron specifications based upon chemical analysis only. Dr. Richard Moldenke was called upon by the chair to ex-

plain the situation more fully, which he did in both English and German, Secretary Reitter adding the substance in French, and thereupon the motion was carried.

In addition, the committee instructed Walter Wood, Philadelphia, to gather the necessary information relative to the unification of cast iron pipe specifications, these being nearly identical at the present time for America, Germany and England. This will be done at once, and as conferences with the English and German representatives have done much to harmonize the test bar question, substantial progress is sure to be made toward identical cast iron specifications.

**Iron and Steel Nomenclature.**

The report on the nomenclature of steel and iron was next taken up and so heavily criticised that the whole subject was referred back to the committee for revision. H. M. Howe and Albert Sauveur are the American representatives on the committee. The report as originally presented was given in *The Iron Age* of March 28, 1907, page 966. The latest report makes some changes in the body of the first one, chiefly additions. There is also an extensive addition devoted to definitions of the microscopical constituents of iron and steel—cementite, martensite, &c. For these the chairman of the committee suggests the term "metaral," corresponding to "mineral," since "microscopical constituent" is cumbersome and not entirely accurate. Since the publication of the first report the committee has received many criticisms and suggestions, some of which have been adopted. None of the societies which had been asked to discuss the report had expressed an official opinion, this, it was explained, being outside their province. However, the Iron and Steel Institute discussed it and thus had brought out useful suggestions.

The report was discussed by Professor Richards, Professor Le Chatelier, Mr. Harbord, Director Greiner and others, and the point was brought out that no matter how much scientific names for the various products are desirable, nothing would be accomplished against the popular terms or "nicknames" for these materials. We have only to think of the misnomer "semisteel" in this connection.

The report on specifications for copper was then presented and accepted.

After the close of the session about 500 of the members visited the Royal Danish Porcelain Works and were much interested in the casting process by which china and porcelain are made.

The American members were then driven to the American Legation and entertained by Minister Egan. They also met Dr. Frederick A. Cook of North Pole fame. In the evening a reception was given at the Raatshus.

## THURSDAY MORNING.

In Section A, discussion of copper specifications was resumed. Mr. Guillet, on behalf of his commission, asked for permission not only to unify, if possible, the several specifications for copper, but also to take up the copper alloys. Professor Martens' request that the Copper Committee be united with that for steel and iron was not approved.

**Wrought Iron Pipe.**

The proposed specifications for wrought iron pipe next came up. They were prepared by A. C. Karsten. On motion this matter was referred to Committee 1 with power. Mr. Robertson called attention to the fact that the Gas Engineers' Society had met at Paris and had also taken this up, particularly the question of standard threads. If threads were also to be considered, then the personnel of the committee would have to be specially made up for that subject.

**Methods of Testing Hardness.**

Dr. Ludwik reported on his hardness test by means of steel cones. The balance of the morning was taken up with an extended discussion of the subject of hardness tests by the above and the Brinell methods, as well as the recent dropping ball methods. Dr. Benedict objected to the Ludwik method for hard substances, though conceding it to be all right for softer materials, such as mild steel. Mr. Jungstetter believed that if instead of depths being measured the diameters of the impressions were taken the results would be more valuable. Mr. Thomas thought that the method would give valuable disclosures on the question of the homogeneity of the materials tested. Mr. Guillet emphasized the importance of the thermic conditions of the piece—that is, if a specimen had been quenched and then tempered or annealed, that the decarburized skin be first removed before testing. Dr. Rosenhain showed how easily the point of the cone could be damaged in being forced into metals and therefore the measured depth would be erroneous. Professor Delbrik objected to a multiplicity of methods for the same thing. Professor Martens believed that did not matter provided a method was finally followed that gave reliable results all the time for everything. Professor Hannover suggested that the dropping ball method, with its imperceptible indentation, is good, especially for fine surfaces which could not be damaged, as, for instance, chilled rolls in which the pushing in of a Brinell steel ball would ruin the surface. Professor Belelubsky said that the cone method had been tried in Russia on steel rails and failed, whereas the Brinell method was satisfactory. Professor Heyn called attention to the fact that when a ball was pressed into metals the indentation was not always round, but flattened, as the ball was pressed together, and hence the geometrical formula did not hold and the calculations were incorrect.

## THURSDAY AFTERNOON.

Mr. Stead continued the discussion by showing that if an etched surface of a tailpiece were scratched by a fine steel comb and then subjected to bending or tension the portion of the metal which did elongate could be readily seen. Further, if a steel gear wheel or any tool were subjected to the dropping ball test of every piece, defective tools could be sent back for retempering. Dr. Ludwik closed the discussion, answering each point, and contended that every method had a place for its particular line of material.

Engineer Königsberger presented a resolution, which was adopted, establishing a commission to study the relation of the wear of a material when compared with its hardness.

**Methods of Testing Cast Iron.**

Dr. Moldenke then delivered the report of Commission 25 on "Methods of Testing Cast Iron," explaining the progress made and urging international action on the purchase of pig iron by chemical specification. It is as follows:

Your commission to establish uniform methods of testing cast iron and finished castings begs to report that since the Brussels Congress considerable attention has been given the subject of testing cast iron in various countries, and that as the nature of this material becomes better known there is greater likelihood of arriving eventually at a basis of agreement upon the methods of testing to be used. Elaborate tests have been made in Germany, which in the main agree with those carried out some years ago in the United States. As a consequence the three sizes of test bars specified have been replaced by a single one. This is very important, as it shows an agreement with the American tendency to treat cast iron from an entirely different standpoint from that of steel or other metals.

It is a well known fact that no material that we know of shows such a lack of homogeneity as cast iron or such a range of varieties from widely differing extremes in physical characteristics. Consequently every painstaking and elaborate series of investigations of a national character helps to bring this condition of affairs home very closely to those who test and use iron castings. The published results of one nation do not seem to carry the weight they might be expected to have in other countries. Every society or national body of engineers appears to have to dig this information out for itself, and perhaps after all this may be the best in the end.

THE PLACE OF THE TEST BAR.

It is with pleasure, therefore, that we can report that in view of the evident impossibility of obtaining actual strengths existing in the several parts of a casting, by means of test bars either loose or attached, the results of the most recent investigations of Germany and the United States confirm the desirability of judging castings by the quality of the metal and its suitability for the purpose, as shown by a standard test bar. This should be cast under the most perfect conditions possible, so that influences possible of manipulation may be excluded, and the metal used for the work be given full opportunity to show its intrinsic value. Naturally, where it is possible to test the castings themselves, this is resorted to, as witness the specifications

for American car wheels. Again, even with perfect metal, as shown by a standard test bar, improper shop conditions may spoil the work. Yet on the whole, experience has shown the value of knowing exactly what the metal is that goes into the castings, rather than attempting to attach coupons or place test bar patterns of various kinds in the molds themselves.

Perhaps the nearest approach to the latter has been obtained by the use of hollow prisms or cylinders with the same metal, and the planing out of test strips from the walls. You will have a report before the congress on this very point. In the United States the use of cylinders from which test bars were cut has been in vogue for a long time and they are still employed in the case of munitions of war. As the cylinders have the same thickness as the projectiles, it practically becomes the taking of a piece of the casting to see how strong it is.

THE TEST BARS OF VARIOUS COUNTRIES.

German and American test bars are of practically the same diameter, and are cast under nearly the same conditions, differing only in the manner of pouring and the fact that the German bar is twice as long. Denmark still makes use of the very long bar, loaded gradually at the center until a maximum called for has been reached. This method was formerly much used in the United States, but was found too elaborate for commercial conditions. Italy makes use of a very short bar, heavily loaded. It is interesting to note that the 1-ft. bar of the United States is half way between the Italian and the German test pieces. Italy further specifies a drop test on its bar, which is of interest. Denmark requires a hammer test for softness and absence of brittleness. Germany leaves out a tensile test. American makes it optional and Italy includes it in the specifications.

Regarding the testing of castings, it may be said that cast iron pipe takes a prominent place, a number of countries having specifications for this important branch of the casting industry. The international character of the business is bringing about much thought on simplifying the several specifications, so that greater uniformity may result as between the several countries that ship pipe abroad.

FOUNDRY PIG IRON.

Perhaps, however, the easiest point for agreement between the countries specifying for cast iron products might be found in the basis of the whole industry, namely in foundry pig iron. The American members are presenting to this congress the specifications newly adopted by that country, after long study and discussion; from these it will be seen that every possibility of chance has been eliminated, and a carefully divided range is given for every element with the variation to be allowed. Perhaps a study of these specifications by the various countries may lead to suggestions and modifications resulting in an international set of specifications for foundry pig iron, facilitating the purchase and sale of foundry pig iron the world over.

Director Greiner objected to judging complicated castings by means of small test bars, and Dr. Moldenke answered by going into the constitution of cast iron a little and showing how impossible it is to get from test bars anything but the quality of the metal entering into castings. This closed the subject. By request of Dr. Moldenke all cast iron commissions of the International Society were merged in Committee 1, as the testing of cast iron now becomes a matter of specifications entirely.

The electric and magnetic properties of metals for testing purposes were next taken up. Mr. Guillet went into the subject thoroughly. He asked for a commission to study the relation of mechanical to electrical testing. This was granted. Professor Weiss then took up the subject of ferromagnetism, elaborating upon it quite fully.

**Slag Inclusions in Steel.**

Dr. Rosenhain explained the slag inclosure problem. It was also elaborated upon by Mr. Stead, who held that it is a mistake to secure the greatest freedom from oxidation and slag in making steel, and then pour it through air into molds, which means oxidation and slag freshly formed. A resolution to form a commission to study the problem was passed. Professor Rosenhain's paper emphasized the importance of further study of the influence exerted upon the strength and safety of steel by the presence within its mass of numerous inclosures of nonmetallic bodies known as "slag inclosures." While some metallurgists appear to regard these as harmless, the author had repeatedly called attention to their dangerous nature, and was led anew to bring up the subject by recent knowledge of definite cases of failure due to slag inclosures. Microphotographs were given of a number of specimens showing inclosures in gun and rail steel and in wrought iron.

**Comparison of Cast Iron in Separately Cast Samples and in Samples Cut from Castings.**

Mr. Meyer presented the results he obtained with tests of cast iron at the Sulzer Bros.' foundries at Winterthur, Switzerland. The method followed and the results of the tests were summarized as follows:

Experience shows that separately cast test samples give higher values for bending and tensile strength than such as are cut out of castings. Our object in making the two series of tests was to ascertain what influence the slow cooling, to which castings may be subjected, exercises on the grain or on the strength of the cast iron, and what part is played therein by the different thicknesses of metal. It is a well known fact that, with given thickness of metal, cast iron shows itself softer, *i. e.*, more coarsely grained, when it forms a core piece, and harder, *i. e.*, more finely grained, when it is cast in the form of a flat piece or as a bar. The difference in the grain is, of course, the greater, the thinner the wall of the section.

Series I of the tests was made by us on a cast iron of tough quality, such as we use for high pressure pieces for steam pipes and other structural parts on which strength requirements of a high order are made, while Series II concerns ordinary engineers' cast iron for larger parts. The separately cast test samples and the castings from which test pieces were worked, were taken from one and the same ladle. All the molds were blackened and well dried. The rectangular test pieces were cast in an inclined position; those of rounded section and the larger castings vertically, in each case from below. We allowed the bars, plates and hollow castings to cool completely in the molds.

The rectangular tensile test pieces were worked directly out of the castings, while the rounded tensile test pieces, the bars for the impact tests and the cubes for the compressive tests were worked out of the broken bend test samples. All the results given are the means of tests made with at least three samples in each case. The impact strength in kilograms per meter is that corresponding with the sum of the work done by a number of single blows of a rammer of 12 kg. in weight, with a distance apart of the supporting knife edges of 160 mm. The first blow was delivered from a hight of 150, 300, or 400 mm., according to the strength of the sample. After each blow the hight of fall was increased by an additional 100 mm., and the blow which finally produced the fracture has in each case been included in the number reckoned.

While the separately cast test samples, with rectangular and circular sections, and the samples taken from plates of successively reduced section in general show gradually increasing strength values, the samples worked out of hollow castings of all the different sizes experimented with give values that are pretty much the same. The test samples of circular section show greater bending and tensile strengths than those of rectangular section. The samples worked out of plates are, in strength, somewhat behind those separately cast. Similarly the strength figures for the various thicknesses of metal of the hollow castings fall short of those of the separately cast samples, and, in a less degree, of those of the plates. This is less apparent in connection with castings of the larger dimensions, but shows itself very clearly in those of the smaller ones. The comparison of the impact strengths show that these are greater in the samples worked out of larger bodies than in the ones that were separately cast, and in like manner the flexure of the former samples was greater than that of the latter.

The plates cooled somewhat more slowly than the bar samples. The material proved somewhat softer, and accordingly gave somewhat smaller values for the bending, tensile and compressive strengths, but was better as regards flexure and strength to resist impact.

We see this in more pronounced form in connection with the hollow [rectangular section] castings. These have naturally cooled more slowly than the plates, and indeed the heat must have been distributed over the whole casting in such a manner, that the cooling took place in all the dimensions of 30, 40, 50 and 60 mm. simultaneously. The grain, and with it the strength of the material, remained the same in all the four walls.

Excursions to machine shops were then made. A meeting later in the afternoon was called, on the request of Mr. Webster, to consider the question of unification of specifications of iron and steel and what Committee No. 1 could do in that respect.

In the evening a visit to Copenhagen's great theater was arranged for.

## FRIDAY'S SESSION.

Professor Schuele reported on tests for endurance and quality in copper wire, with special reference to trolley wire and similar materials under tension and alternate stresses. Professor Le Chatelier held that the subject of alternate stresses was the most important before the con-

gress, that too little was known in this connection and that special study should be given the subject so that experimental research might be rightly directed. Messrs. Guillet and Heyn discussed the question further, and a letter from J. E. Howard of the Watertown Arsenal was read. A special commission will work on the subject further.

Impact tests were then taken up, G. Charpy reporting at length on this. He stated that the work of the German Testing Society was monumental in this respect and that it should form the standard with which all other work could be compared. The discussion covered the greater part of the day and resulted in the adoption of the Charpy machine as a standard. Details were left open regarding the use of the machine, but the Charpy standard test pieces were adopted.

Excellency Exner then gave a deep discussion on the relation of the state to the work of the association, pointing out how with all the care taken in railroad work it was an anomaly that automobiles were allowed to run at railroad rates of speed on ordinary roads without supervision or tests of their component materials. Most of his remarks naturally applied more to European condition than American.

The subject of the nomenclature of iron and steel was then taken up again and a series of changes in names voted upon. This was the result of the getting together of the metallurgists of the congress during the session. A commission was then ordered to regulate the definition of terms now used with various meanings, such as "malleability," "tenacity," &c.

## THE CLOSING DAY.

President Alex. Foss presented several resolutions amending the constitution of the society relative to its publication and means of income. The chairman of the several sections read the resolutions adopted and these were ratified by the congress. In addition to those already mentioned, several resolutions relating to rust prevention, galvanizing and tinning of iron and steel were adopted, as well as one relative to the study of timber in large specimens as against the small ones now in use.

### The Next Congress in the United States.

It was voted that the next congress be held in the United States in 1912 and the invitation of the American Society for Testing Materials was accepted. United States Minister Egan also promised to bring the matter before the authorities at Washington so that government co-operation might be had. Russia invited the congress for the meeting following the American. This (Copenhagen) congress marks the twenty-fifth year of the existence of the International society.

Dr. Chas. B. Dudley was then formally elected president of the society amid great enthusiasm. He responded most feelingly.

The usual resolutions of thanks were presented, and J. E. Stead gave a highly interesting talk (illustrated by lantern slides) on the use of the microscope in the shop and mill for iron and steel. The congress then adjourned.

The farewell dinner was held in the evening at Marienlyst (near Elsinore). An extended trip was projected into Jutland after the congress.

## The United States Steel Corporation's Share of the Total Production of Iron Ore, Coke, and Iron and Steel in 1908.

The current issue of the *Bulletin* of the American Iron and Steel Association presents a table giving the production in 1908 of iron ore, coke, pig iron, steel ingots and castings, finished rolled iron and steel, wire nails, and tin plates and terne plates by the United States Steel Corporation, as compared with the production of all other interests; also the same comparison as to shipments of iron ore from the Lake Superior region. The table shows that the corporation produced in 1908 considerably less than one-half of the total production of pig iron and finished rolled iron and steel and over one-half of the total production of steel ingots and castings. All its figures include the production of the Tennessee Coal, Iron & Railroad Company in 1908. With the exception of rolled forging blooms and rolled forging billets, all unfinished and intermediate rolled products, such as billets, blooms, slabs, sheet bars, tin plate bars, muck bars, &c., are not included in the table. Nor do the figures include hammered, car, locomotive, or other axles, anchors, shafting, hammered or pressed armor plate, and other hammered or forged products. For the first time in a table of this character open hearth steel rails and tin plates are separately enumerated. The table, with the percentages for previous years, is as follows, the quantities being given in gross tons except as otherwise stated:

| Products. | By U. S. Steel Corporation. | By all other interests. | Total shipments and production. | Percentage of U. S. Steel Corporation. 1908. | 1907. | 1906. | 1905. | 1904. | 1903. | 1902. |
|---|---|---|---|---|---|---|---|---|---|---|
| Shipments of iron ore from the Lake Superior region | 14,579,013 | 11,435,374 | 26,014,987 | 56.0 | 54.7 | 54.2 | 56.0 | 53.8 | 58.8 | 60.4 |
| Total production of iron ore | 16,662,715 | 19,320,621 | 35,983,336 | 46.3 | 43.3 | 43.2 | 43.4 | 38.0 | 43.8 | 45.1 |
| Production of coke, net tons | 8,169,931 | 17,863,587 | 26,033,518 | 31.3 | 30.3 | 36.5 | 37.9 | 36.6 | 34.2 | 37.4 |
| Spiegeleisen and ferromanganese | 115,344 | 36,674 | 152,018 | 75.8 | 54.9 | 67.2 | 74.9 | 70.5 | 81.0 | 81.0 |
| Bessemer, basic, low phosphorus, foundry, forge, ferrosilicon, &c. | 6,819,064 | 8,964,936 | 15,784,000 | 43.2 | 41.7 | 44.2 | 43.8 | 44.3 | 39.9 | 44.3 |
| Total pig iron, including spiegel, ferromanganese, ferrosilicon, &c | 6,934,408 | 9,001,610 | 15,936,018 | 43.5 | 41.9 | 44.5 | 44.2 | 44.6 | 40.4 | 44.7 |
| Bessemer steel ingots and castings | 4,055,275 | 2,061,480 | 6,116,755 | 66.2 | 64.7 | 65.7 | 67.4 | 69.0 | 72.0 | 73.9 |
| Open hearth steel ingots and castings | 3,783,438 | 4,053,291 | 7,836,729 | 48.2 | 47.9 | 49.6 | 51.4 | 50.4 | 51.0 | 52.4 |
| Total Bessemer and open hearth steel ingots and castings | 7,838,713 | 6,114,771 | 13,953,484 | 56.1 | 56.4 | 58.1 | 60.2 | 61.0 | 63.5 | 65.7 |
| Bessemer steel rails | 795,713 | 558,523 | 1,354,236 | 58.7 | 51.6 | 52.6 | 53.6 | 57.2 | 65.6 | 65.4 |
| Open hearth steel rails | 260,580 | 306,724 | 567,304 | 45.9 | ... | ... | ... | ... | ... | ... |
| Structural shapes | 510,343 | 572,838 | 1,083,181 | 47.1 | 54.9 | 54.6 | 54.6 | 55.1 | 60.3 | 57.9 |
| Plates and sheets, including black plates for tinning | 1,377,089 | 1,272,604 | 2,649,693 | 51.9 | 55.8 | 56.3 | 57.4 | 58.0 | 59.9 | 59.4 |
| Wire rods | 1,234,220 | 582,729 | 1,816,949 | 67.9 | 71.5 | 71.7 | 69.9 | 71.3 | 73.1 | 71.5 |
| Bars, skelp, nail plate, iron rails and other finished rolled products | 1,394,179 | 2,963,247 | 4,357,426 | 31.9 | 33.9 | 33.8 | 31.0 | 28.6 | 29.8 | 31.1 |
| Total finished rolled, including rolled forging blooms and billets | 5,572,124 | 6,256,665 | 11,828,789 | 47.1 | 47.5 | 48.1 | 47.3 | 47.8 | 51.2 | 50.8 |
| Wire nails, kegs of 100 lb | 6,529,718 | 4,133,254 | 10,662,972 | 61.2 | 66.4 | 65.5 | 66.1 | 67.0 | 70.6 | 64.8 |
| Tin plates and terne plates | 386,718 | 150,369 | 537,087 | 72.0 | ... | ... | ... | ... | ... | ... |

The Department of Commerce and Labor has issued a circular calling the attention of manufacturers and business associations to the American Exposition to be held in Berlin, Germany, from May to July, 1910. John M. Carson, chief of the Bureau of Manufactures of that department, Washington, D. C., will be pleased to furnish such information as may be in his power.

Iron frame suspended vanners of the new type will be installed by Stratton's Independence, Ltd., Victor, Colo. This, with similar recent installations, marks a distinct departure in the use of iron construction for concentrating machinery, as the thousands of standard frue vanners in service have wooden frames.

# AN EAST INDIAN IRON AND STEEL PLANT.

## The Tata Iron & Steel Company, Limited, at Sakchi, via Kalimati, Bengal-Nagpur Railroad, Bengal, India.

The firm of Tata, Sons & Co., Bombay, founded by the late manufacturer and merchant, Jamsetjee Tata, and now controlled by his sons, organized and incorporated in 1907 the Tata Iron & Steel Company, Ltd., for the purpose of converting the raw materials of India into iron and steel products, for which the country offers an extensive and rapidly growing market.

The company is entirely an Indian enterprise, with a native Indian Board of Directors and some 7000 individual shareholders. The initial share capital is £1,545,000 ($7,518,000). The first chairman of the Board of Directors was D. J. Tata, who is also the head of the firm of Tata, Sons & Co., the agents of the steel company; since his absence in Europe R. J. Tata of the same firm has been the chairman. The other members of the board are: H. H. The Thakore Saheb of Morvie, G. C. I. E.; Sir Sassoon David, Kt. (of Sassoon J. David & Co.); Sir Cowasji Jehangir, Bart. (of Sir J. Cowasji Jehangir & Co.); the Hon. Sir Vithaldas D. Thackersey, Kt. (of Thackersey, Mulji & Co.); Gordhandas Khattau (of Khattau, Mackanji & Co.); Fazulbhoy C. Ebrahim (of Currimbhoy, Ebrahim & Co.); Narottam M. Goouldas (of Morarji, Goouldas & Co.); P. D. Pattani (Dewan of Bhavanagar State), and A. J. Bilimoria (of Tata, Sons & Co.). Robert Goss Wells, lately of the Youngstown Sheet & Tube Company, Youngstown, Ohio, is the general manager of the company. Mr. Wells joined duty in January last, with headquarters at Sakchi.

Under the direction of the consulting engineer, C. P. Perin of New York, extensive investigation of the natural resources of the central portion of India had been previously undertaken, as described in an illustrated article printed in *The Iron Age* of July 12, 1906, resulting in the securing for the new company of the following valuable deposits of raw materials:

### The Raw Material Supplies.

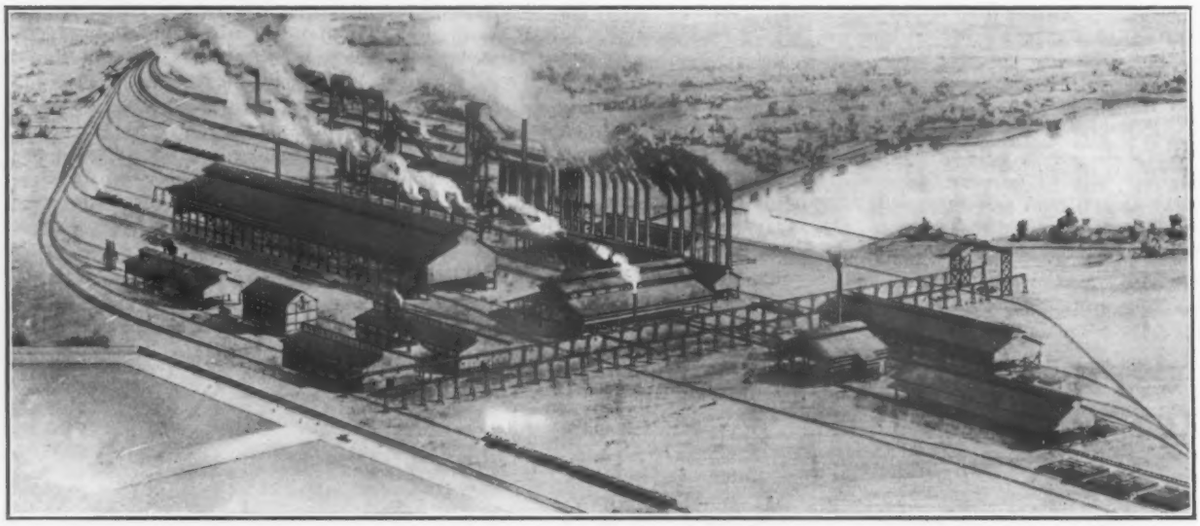
1. *Iron Ore.*—In the States of Mayurbhanja, Orissa, distant about 200 miles from the port of Calcutta, three large beds of hematite iron ore have been discovered, of which only the one at Gurumaishini will at present be exploited. In this one locality there are in sight some 20,000,000 tons of ore on various ridges, analyzing as follows:

| | Per cent. | | | |
|---|---|---|---|---|
| | Iron. | Silica. | Sulphur. | Phosphorus. |
| Sundal Ridge | 63.57 | 2.60 | 0.023 | 0.028 |
| Rangamatia Ridge | 59.20 | 4.10 | 0.014 | 0.087 |
| Tulla Ridge (solid ore body) | 66.13 | 1.17 | 0.016 | 0.054 |
| East of Rangamatia (solid mass) | 67.60 | 0.60 | 0.038 | 0.017 |

Gurumaishini is situated some 40 miles from the new works and will be connected with the works by a broad gauge railroad, now being constructed by the Indian Government. Two other deposits of similar character are located a few miles beyond the present terminus of the new mineral railroad. The company possesses also considerable deposits of iron ore at Dhullee, in the Raipur District. Though this ore is even richer, containing about 67 per cent. of iron, while the phosphorus comes well within the Bessemer limit, the advantage in freight makes it advisable to begin exploitation in the Gurumaishini field.

2. *Fuel.*—The company has purchased a large area of coal land in the eastern part of the Jherria field. The coal produces a hard, strong coke, suitable for metallurgical purposes, low in sulphur and having an average ash content of about 18 per cent. The coal property is about 100 miles from the works.

3. *Flux.*—The company will have available flux for the blast furnaces in two forms—calcite and dolomite.



View of the Plant of the Tata Iron & Steel Company, Ltd., Now Under Construction.

4. *Manganese Ore.*—The company owns manganese mines of considerable importance in the neighborhood of Nagpur. The ore contains about 50 per cent. of manganese.

It can be stated, therefore, that the new steel company controls for practical purposes an unlimited supply of the four necessary raw materials—iron ore, coking coal, flux and manganese ore.

### The Character and Location of the Works.

To utilize these raw materials it was decided to construct an up to date iron and steel plant of a yearly capacity of 120,000 tons of foundry iron, rails, shapes and merchant bars. The Indian Government granted a special freight rate of 0.15 penny (0.3 cent) per ton-mile for raw materials, supplies and finished products. It placed with the new company an order for 200,000 tons of rails, for periodical delivery, and undertook to construct a broad gauge railroad to connect the works with the Mayurbhanja iron ore mines.

A site comprising 23 square miles of land was secured, partly in fee and partly on long lease, the land being located alongside of the Bengal-Nagpur Railroad, near Kalimati, 152 miles west from Calcutta. At this point the combined freight charges for raw materials, supplies and export products were found to be the most advantageous. The climate at the site is healthy. The elevation of the works is about 535 ft. above sea level and the natural drainage is perfect. The ground for

foundations consists of impervious and fireproof mica schist, uniformly found at a depth of 4 to 6 ft. below the surface.

The property is bounded on the north and west by the Subernarekha and Kharkhai rivers, from which a sufficient supply of water is obtained. A concrete weir about 1200 ft. long has been thrown across the former river, and a reservoir 47 ft. deep, with an area of about 60 acres, is now being constructed, into which water will be delivered from the river pumping station through a 30-in. welded steel pipe 9300 ft. in length. A town, arranged for a population of 20,000 Europeans and Indians, is being constructed. More than 100 bungalows are now under roof or above ground. The town and works sites are connected with the Bengal-Nagpur Railroad by a broad gauge (5 ft. 6 in.) railroad, 3 miles long. Large receiving yards are being constructed at Kalimati by the railroad.

Julian Kennedy, Sahlin & Co., Ltd., of Pittsburgh and Brussels, have been engaged as constructing engineers and designers for the works, which are shown in plan and perspective in the accompanying illustrations. This plant is being built in the most substantial and durable manner and with due regard to the progress of the art and to the necessity of furnishing a simple and easily worked installation for this new and distant industrial territory.

**The Details of the Plant.**

The coking arrangements cover 180 non-by-product coke ovens, fitted with coal breaking and crushing apparatus for a capacity of 700 tons per 10 hr., coal storage bin, electric charging larries and electrically driven coke pushers and levelers. The coke is carried on steel cars from the coke ovens to the blast furnace charging pockets.

The blast furnaces, two in number, are each 19 ft. in diameter and 77 ft. high, each equipped with inclined double skip hoist, automatic stock pockets served by electric charging larries, four 22 x 90 ft. central combustion chamber Cowper-Kennedy hot blast stoves, dust catchers and centrifugal gas cleaners. The iron can either be run liquid into ladles or cast into pigs. The slag is removed in self-emptying slag cars.

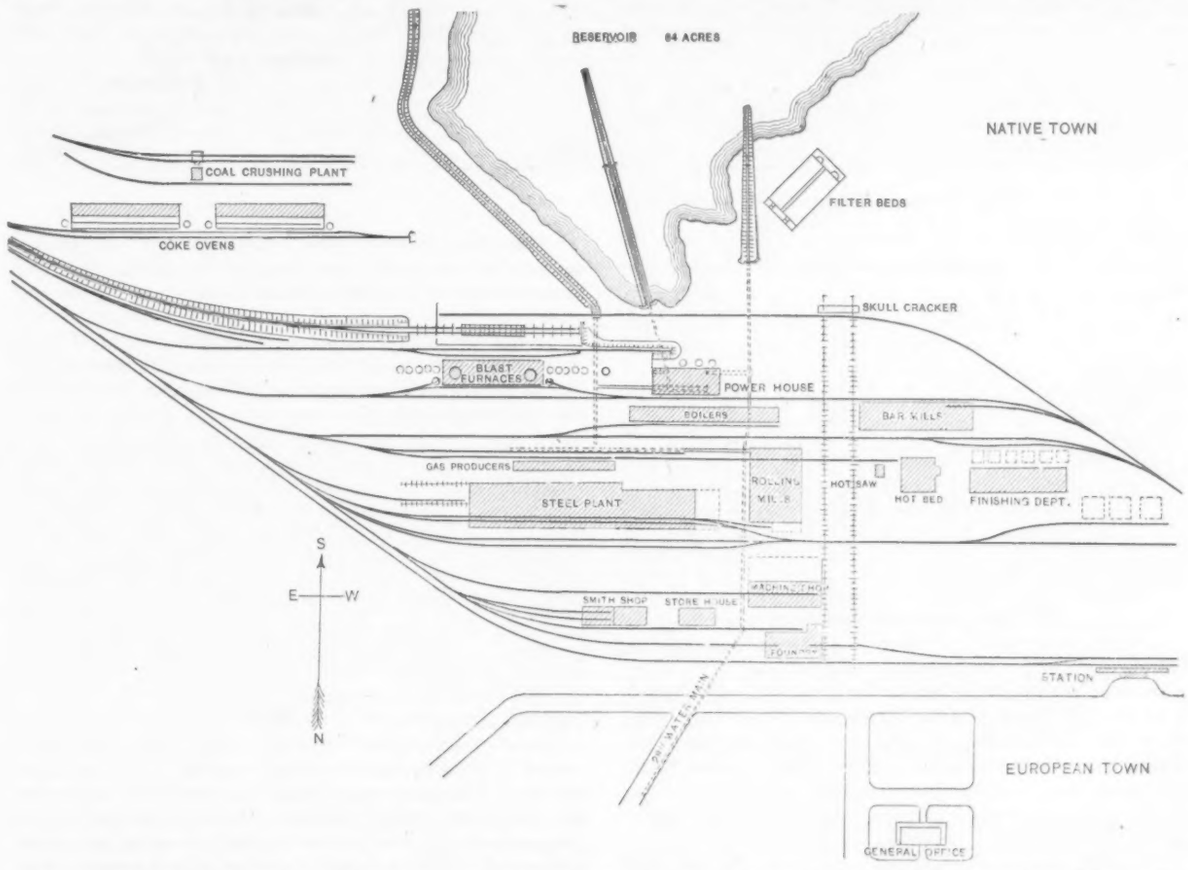
The available gas from the blast furnaces, supplemented by hand coal firing, will be used in a central boiler plant, consisting of 8000-hp. Babcock & Wilcox boilers. Each blast furnace will be blown by one out of three Zoelly type turbo blowers, having a capacity of 30,000 atmospheric cubic feet of blast per minute against a pressure of 18 lb. per square inch. The turbo blowers are equipped with separate surface condensers.

The electric power plant consists of three 1000-kw. turbo generators, direct coupled to Zoelly type turbines, with surface condensers. The dynamos generate three-phase current, 3000 volts, 50 periods. Part of this energy is transformed by two motor generators into 250 volt direct current, to be used for cranes and in the rolling mill plant. Another part is cut down by stationary transformers to a tension of 440 volts, and distributed throughout the works. Still another part is carried at high tension to the river pumping station, about 2 miles from the works.

The pumping plant consists exclusively of centrifugal type pumps for the distribution of water throughout the works for hydraulic pressure, boiler feed, filters and town service. The whole of the blowing, generating and pumping machinery is concentrated in one central power plant, located alongside the boiler plant.

The steel plant is located in a building, 135 x 650 ft., containing one 300-ton gas fired mixer resting in cradles, four 40-ton basic open hearth furnaces and three five-hole gas fired soaking pits. All the furnaces are equipped with Dyblie water cooled reversing valves. The metal is brought in ladles from the blast furnace plant and is poured into the mixer by one of the two 75-ton casting cranes. The ingots are cast in molds standing on cars. At the east end of the steel plant is located a stock yard covered by a 10-ton traveling crane running on trestles. All cold stock is charged into the furnace by a charging machine running on an overhead runway. The ingot molds are stripped and charged into the soaking pits by special charging and drawing machines suspended from crane bridges.

On a line parallel with the furnace building is located a battery of 16 Morgan mechanical gas producers, with revolving bottom, hearth and tuyere. The producers are




Plan of the Works of the Tata Iron & Steel Company, Ltd., Now Being Built at Sakchi, Near Kalimati, Bengal-Napur Railroad, Bengal, India.

equipped with Ce rge patent automatic revolving feeds. Each furnace is fired independently by the necessary number of producers.

**The Rolling Mill.**

The heated ingots are carried from the soaking pits in an electrically driven tilting chair, which conveys them to the rolling mill building, measuring 150 x 216 ft. In this building is placed an Ehrhardt & Sehmer three cylinder reversing engine, noncondensing, with cylinders 51⅝ x 51⅝ in. On one side of this engine, and connected to it by a hydraulic coupling, is a blooming mill, which is a duplicate of the blooming mill of the Youngstown Sheet & Tube Company, Youngstown, Ohio. The pinions, which have a diameter of 40 in., are made of forged steel and run in oil in hermetically closed housings. The steel blooming rolls have a length of 80 in., with a diameter of 33 in.; they are served by tables with 18 in. diameter steel rollers and by a hydraulic manipulator. The shear is of the steam hydraulic type, with both knives movable. The upper knife is dropped by gravity on the bloom and held in position while the lower knife does the cutting. The blooms are transported directly by an overhead charger from the shear table to the rail mill table, or to a reheating furnace placed in the mill building and fired with gas from the general producer plant.

At the opposite side of the engine and connected by a hydraulic coupling similar to the one for the blooming mill is a 28-in. two-high reversing rail mill, with three stands of rolls; the pinions are of forged steel running in oil in hermetically closed housings. The rail mill is served by two traveling transfer tables, equipped with steel rollers and mechanism for tilting the bloom as required. From the finishing stand the bar is delivered on a long line of rollers leading to the hot saw, which is placed in a separate building at a distance of 300 ft. from the center of the rail mill.

Behind the saw the cut bars pass over a section of rollers equipped with tilting mechanism, by which they are placed on their flanges before they are delivered on the double cooling bed, measuring 72 x 80 ft. From the cooling bed the bars are passed through a roll straightening machine and delivered into the finishing department, which contains the usual machinery for finishing rails and beams and which is commanded by a 10-ton traveling crane. The rails or bars are finally placed on the inspection beds, located alongside of the finishing shed. Between the mill building and the hot shear building, crossing all the railroad tracks in the works, is an elevated crane runway 1073 ft. long, with a span of 85 ft., forming an ample and accessible yard for stock and materials of every description. This yard is commanded by a 10-ton traveling crane. At one end of the yard is placed an electrically driven skull cracker.

**Auxiliary Buildings.**

Alongside of the stockyard is placed a machine shop, 72 x 216 ft., commanded by a 30-ton traveling crane, with a 5-ton auxiliary hoist, and containing the equipment of tools usual for iron and steel works, comprising roll turning lathes, large and small machine lathes, horizontal and vertical boring mills, planers and shapers, drill presses, wheel presses, erecting plates and toolroom equipment.

Contiguous to the machine shop is placed a foundry, 72 x 192 ft., equipped with two cupolas served by electrically driven rotary blowers, core ovens, brass furnaces and the usual equipment.

Conveniently located to the foundry and machine shop is placed a three-story fireproof brick and steel building. The two lower floors are used for stores, and the top floor is utilized for pattern shop and storage.

At the rear end of the above building is located a steel building containing a blacksmith shop, providing space for steam hammer, with heating furnace, blacksmiths' fires and the necessary equipment; also boiler shop equipment, consisting of punchers, shears, drills and plate bending machine. At one end of the building is provided shed room for four locomotives.

The mill buildings throughout are placed due east and west, with protected gables and open north and south elevations. This will in the latitude of Sakchi (Kalimati), where the declination of the sun from its zenith is 0° 30' north at midsummer, and 42° south in midwinter, procure continuous shade in the interior and at the same time free circulation of air. The building frames are of steel and of heavy design, so as to withstand the occasional tropical storms. The columns are not less than 34 ft. high. The roofs and walls are of corrugated puddled iron sheets.

The railroad system in the works consists of about 8 miles of 5 ft. 6 in. gauge tracks, laid with 75-lb. per yard standard Indian flanged rails resting on Saalwood ties. The rolling stock consists of four six-wheeled yard locomotives, weighing 45 tons, with separate low back shifting tenders; also the cars necessary for handling hot metal, slag, waste material, ingots, blooms and pig iron. There are also two traveling steam cranes of 6 tons capacity, capable of being used for light switching.

Adjacent to the shops and steel plant will be placed a brick building containing testing machines and physical and chemical laboratories.

**The Contractors.**

Some of the principal contracts for the new plant have been placed with the following firms:

Cement, Rheinisch-Westfaolisches Cement-Syndikat, G.m.b.H., Bremen; rails, Bolckow, Vaughan & Co., Ltd., London; locomotives, American Locomotive Company, Allegheny Works, Pittsburgh; cars, Arthur Koppel, Soc. Anon., Brussels; boilers, Babcock & Wilcox, Ltd., London; coke ovens, Evence Coppee, Brussels; steel buildings, A. & J. Main & Co., Ltd., Glasgow and Calcutta; iron and steel work for blast furnaces, mixer and steel and heating furnaces, August Kloenne, Dortmund, Germany; turbo-blowers, turbo-generators and transformers, Escher, Wyss & Co., (Lahmeyer), Zurich and Frankfort; electric motors and accessories, Allgemeine Elektricitaets Gesellschaft, Berlin; pumps, Sulzer Frères, Winterthur; 59-in. steel water mains, Thyssen & Co., Muelhein a.d. Buhr, Germany; blooming and rail mills, Duisburger Maschinenbau A-G., vormals Bechem & Keetman, Duisburg, Germany; rolling mill engine, Ehrhardt & Sehmer, G.m.b.H., Saarbruecken, Germany; electric traveling cranes, Maerkische Maschinenbauanstalt Ludwig Stuckenholz A-G., Wetter a.d. Ruhr, Germany; firebrick, Glenboig Union Fireclay Company, Ltd., Glasgow, and Harper & Moores, Ltd., Stourbridge.

A branch railroad from Kalmati Station of the Bengal-Nagpur Railroad to the works site is completed, and the foundation for the blast furnaces, steel mill and the principal buildings are under way. The erection of the mill buildings has commenced.

**Prospects.**

The Tata Iron & Steel Company will not be the pioneer in iron and steel making in India. An iron manufacture of a primitive kind, and formerly of considerable extent, has been carried on by the natives during many centuries. More recently the Bengal Iron & Steel Company, for a number of years, has successfully operated two (at times three) blast furnaces at Barrakar, distant about 110 miles from Kalimati, producing foundry iron. The Indian Government is operating an open hearth furnace and the East Indian Railway Company is rolling old rails into merchant bars on a small scale.

Though none of the enterprises mentioned equals in size the new Tata installation, they have served to demonstrate that iron and steel can be produced and rolled in India. The abundant supply of raw materials which is at the disposal of the Tata Iron & Steel Company and an expanding market for its products are two important factors which should insure the success of the enterprise.

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The Carnegie Steel Company has decided to erect a second 22-in. structural mill in its steel works at Clairton, Pa. This mill will roll beams, channels and angles from 10 in. down. It will be a duplicate of the present one and is expected to be ready for operation about January 1, 1910. Contracts for the mill, the engine and other equipment have been placed.

## PERSONAL.

Robert Geddis, assistant general manager of sales for the Jones & Laughlin Steel Company, Pittsburgh, in charge of the hot rolled department, left last week for a three or four weeks' trip, visiting the trade along the Pacific Coast. He will visit the Seattle Exposition.

A. F. Baumgarten, Pittsburgh, has removed to Philadelphia, having accepted the management of the iron and steel department of the Geo. M. Newhall Engineering Company.

Dr. W. H. Tolman, director of the Museum of Safety and Sanitation, New York, has returned from Europe. He attended a large convention at Buda-Pesth.

W. A. Hengstenberg, formerly with the Newhall Chain, Forge & Iron Company, New York, has been appointed secretary and general manager of the Seneca Chain Company, Kent, Ohio. He will have charge of the company's plants at both Kent and Mansfield, Ohio.

T. C. Martin, who has served the electrical public in a journalistic capacity for more than a quarter of a century, has resigned as the editor of the *Electrical World* of New York to accept the position of general secretary of the National Electric Light Association, of which he was one of the founders.

Lewis E. Pierson, who has just been elected president of the American Bankers' Association, has an unusually large acquaintance among the wholesale and retail merchants of New York City. This is partly due to the fact that he is the official head of the Irving National Exchange Bank of that city, which is known as the "bill of lading bank," because of its extensive transactions with those who handle bills of lading, and partly because he has been identified with several movements that have enlisted the support of the mercantile community. Mr. Pierson has been the leader of the fight for reform in the methods of issuing bills of lading, and at a recent conference of merchants, shippers, bankers and carriers, at which he presided, steps were taken which seem to assure the final success of the campaign. All the interests represented agreed to support the reform measures which will be introduced in Congress and in the various State legislatures next winter. The institution of which Mr. Pierson is the head was the first large bank to sell money orders, a function which is now performed generally by banks.

W. S. Chase, manager of sales of the National-Acme Mfg. Company, Cleveland, Ohio, recently sailed for a two months' business trip in Great Britain and on the Continent.

Judge Elbert H. Gary, chairman of the United States Steel Corporation, landed in New York on Tuesday on his return from Europe. Being interviewed by representatives of the daily press, he expressed himself as optimistic concerning the industrial outlook for this country. He said there had been considerable improvement in business conditions in Europe this summer, more especially in France and England.

J. A. Eden, Jr., who has been identified with the forging machinery department of the E. W. Bliss Company, Brooklyn, N. Y., has resigned and taken a position as manager of a similar department for the United Engineering & Foundry Company, Pittsburgh, Pa., who will manufacture an imported line of forging machinery for general work, as well as die forging, and also will push the sale of its patent high speed steam hydraulic press.

William Opel of Russelsheim, Germany, who is at the head of one of the largest automobile manufactories there and who is president of the Automobile Manufacturers' Association of Germany, is making a business trip to this country.

**Dragon Portland Cement.**—One of the most interesting recent trade publications is a 224-page book issued by the Lawrence Portland Cement Company, whose works are at Siegfried, Northampton County, Pa., with sales offices at 1 Broadway, New York, and in the Harrison Building, Philadelphia. This publication is not simply a catalogue, but is a compilation of valuable information regarding the production of cement, its manifold uses, methods of manufacturing concrete, causes of troubles with cement, specifications for concrete blocks, and data on the cost of concrete work in its various forms. The contents are systematically arranged in chapters. Numerous illustrations are given of concrete work in which the company's Dragon Portland cement has been used, such as office buildings, bridges and foundations for such structures. Methods of using concrete in water works construction and filtration plants are comprehensively treated. No less than 26 pages are used for the presentation of miscellaneous cost data, covering all kinds of concrete work, including concrete columns, beam floors of reinforced concrete, flat slab floors, slabs between steel beams, walls above grade, foundation walls, footings, sewers, water conduits and cement pipe. The book is an important contribution to cement literature.

## OBITUARY.

ALEXANDER MCVITTIE, pioneer shipbuilder of Detroit, Mich., died September 15, at Harbor Beach, Mich., as the result of a stroke of apoplexy. Up to a month ago he was president of the Toledo Shipbuilding Company. At one time he was president of the Detroit Shipbuilding Company.

WILLIAM MORAN, the shipbuilder, a member of the firm which built the battleship Nebraska, died September 13, in Seattle, Wash. He is the fourth of the eight Moran brothers to die within four years.

CARL WILLCOX of the sewing machine firm of Willcox & Gibbs, New York, died suddenly from heart failure at his home in Westport, Conn., September 13, aged 65 years. He was an inventor in the sewing machine field.

J. J. HAGERMAN, at one time prominent in the Northwestern iron trade and then residing in Milwaukee, died recently at Milan, Italy, aged 70 years. After withdrawing from the iron business he removed to Colorado, built the Colorado Midland Railroad and engaged in other important enterprises.

WILLIAM H. SINGER, Pittsburgh, who was injured in an automobile accident at Matunuck, R. I., August 25, died of his injuries September 4 at Watch Hill, R. I., aged 74 years. He was born in Pittsburgh, and when quite young entered the service of G. & J. H. Shoenberger, iron manufacturers, and as early as 1853 became a member of the firm of Singer, Nimick & Co., which established a high reputation in the manufacture of tool steel. In 1900 the business of the firm was absorbed by the Crucible Steel Company of America, of which company he remained a director until his death.

**The Western Tin Plate & Sheet Company's Affairs.**—The holders of $50,000 of the preferred stock of the Western Tin Plate & Sheet Company of Greencastle, Ind., met at Anderson, Ind., September 9, and agreed to a transfer of their interests to a new corporation being organized by J. P. Stone and associates of Pittsburgh, Pa., who were represented at the meeting by F. M. Lyons of Greencastle. The new company will have a capital stock of $300,000 cumulative preferred 6 per cent. and $300,000 of common. Preferred stock will be exchanged for the old stock. The bonded indebtedness of the old company, $100,000, will be assumed. The company also has a floating indebtedness of $35,000. The mill has been idle two years. The proposition will be submitted to other stockholders at Greensburg, Summitville, Elwood and Indianapolis.

The district sales managers of the Carnegie Steel Company and the Illinois Steel Company will hold their next quarterly meeting at Chicago October 13, and the Gary plant of the Indiana Steel Company will be visited.

# THE IRON AGE

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RICHARD R WILLIAMS, - - - - - - - - HARDWARE EDITOR


With this number I relinquish the control of *The Iron Age*, with which I have been connected from its commencement, 54 years ago. America was then a half-settled agricultural country, with rudimentary industries and dependent on Europe for most of her manufactured goods. That she might throw off that dependence and become herself the greatest industrial country in the world was the hope and ambition of my father, John Williams, the founder of *The Iron Age*. That result has been achieved, and the journal he established has not been without influence in its accomplishment. It has been my lifework, and I have been proud of its success and standing. From a small beginning it has become the greatest trade journal in the world, with a reputation for accuracy and fairness enjoyed by very few.

It is with pain that I take my leave of the staff to whom most of the credit for this success is due. For loyalty, character and ability it would be hard to match them. I thank the subscribers and advertisers who have made *The Iron Age* the envy of its contemporaries. Few journals can boast of subscriptions and advertisements of 50 years' standing, some of them in the third generation.

The conductors of *The Iron Age* have always felt their responsibility as publishers of an organ of important information to which the trade looked for impartiality and fairness. Its reputation (even in other hands) is dear to us, and on no account would we have entertained a proposition to allow the paper to get into the hands of men whose ideals of journalism were not high. Fortunately this is not the case here. The purchasers are men of standing and eminently qualified for the task they have undertaken. I have known Mr. Root for many years and entertain for him a profound respect and regard, not only as a peculiarly able publisher, but as a charming and high-minded man. His associates are publishers of character, experience and skill. I feel that *The Iron Age* is safe in their hands and wish them all possible prosperity and success.

DAVID WILLIAMS.

## The Duplex Process and the Steel Scrap Situation.

Attention has been called repeatedly to the effect on the steel scrap market of the rapid increase in the production of steel in this country by the open hearth process. What was said by way of prophecy several years ago, when the open hearth was making its most sensational gains upon the converter, has been a matter of actual market experience more recently. The enhancement in the value of melting scrap and at intervals its advance in a particular district independent of the pig iron market, have borne in upon manufacturers of open hearth steel their dependent position. The fact that finished material prices have been held at moderate levels has been at times an added aggravation, the rising cost of raw materials narrowing the margin of profit. In a year like 1909, with sharply competitive prices for most finished materials, the situation has been trying to the last degree.

East of the Alleghenies, where the increase in open hearth steel production has been marked, the scrap problem has been accentuated. The 1908 "Directory of the Iron and Steel Works of the United States" shows about 1,250,000 tons a year greater open hearth steel capacity in that section than existed when the Directory of 1901 was compiled, and plans are now under way for further additions amounting to about 250,000 tons a year. The effect of the competition for such melting steel as is available in the East is strikingly shown in the recent movement among steel manufacturers in eastern Pennsylvania for the purchase of their scrap supplies through a common agency.

Another development that has been less public is the increased attention given the duplex process as affording greater independence of the scrap market. As a result of the investigations made by several interests, it is safe to predict an increasing employment of the duplex process at Northern steel works, with eastern Pennsylvania leading in the movement. In the case of one Pennsylvania works, equipped for the manufacture of both Bessemer and open hearth steel, it is known that for a good many months the Bessemer department, whenever it has been active, has been operated merely as an adjunct of the open hearth. The results, it is understood, have been such as to warrant the continuance and extension of the practice. Another Eastern company, which is about to make a large addition to its open hearth capacity, seriously considers laying out the plant for the duplex process. In a third case, a seaboard plant, where open hearth furnaces are now under construction, it is understood that the existing Bessemer converters will be operated in part in blowing metal preliminary to charging it in the basic open hearth furnace.

How far the electric furnace will arrest the decline of the Bessemer process as a contributor of rail tonnage is yet to be worked out. The results at one conspicuous plant have been excellent, but the cost of thus refining rail steel from the converter is an important factor concerning which more light is desirable. However, it is plainly indicated by the demand for high carbon open hearth rails that a certain amount of Bessemer capacity must hereafter be kept busy by the country's increased production of bars, wire, sheets, tin plates, wrought pipe, and railroad and other specialties, or be operated as an auxiliary of open hearth works. In cases where the Bessemer plant was built for the rail trade and where there are neither connected works rolling the forms of finished steel into which Bessemer steel largely enters, nor inde-

pendent mills within easy reach which buy billets or sheet bars in the market, the second of the above alternatives is likely. With some Northern works able to find advantages in building new converters for the duplex process, it is not difficult to figure economies in employing in that capacity converters already standing.

Little is known of the financial side of the practice at Ensley, Pueblo and Sydney with the duplex process. In all three cases theoretical calculations left little doubt of its economy. The scrap problem was not so much a factor as the character of ores. In roughly determining economies the extra investment in Bessemer plant was set over against longer life of open hearth linings and considerably increased output of open hearth furnaces, together with greater latitude in blast furnace product. In the case of Eastern steel works there are the important additional economies of utilizing plant otherwise only partly employed and of requiring a relatively small percentage of scrap, the latter in many cases the one raw material over which the producer has no control.

## Effects of the German-American Patent Treaty.

The German-American patent treaty establishing reciprocal relations, by means of which the patents of citizens of this country are no longer included in the compulsory working clause of the German act, has aroused much interest abroad, both in its immediate results in the two countries and in its effect upon the relations of other nations. German manufacturers and inventors are complaining because the citizens of a foreign nation are accorded an exemption which they themselves do not enjoy, and are agitating for an international agreement which would place all countries party to it on an equal basis. The American inventor or manufacturer is no longer compelled to work his patent in Germany in order to insure its integrity, but the German himself has no such privilege, nor have the citizens of other nations. When the United States shall have introduced the principle into its statutes, then the German will be exempt from its operation. The British subject will not be, nor will the people of other countries which enforce compulsory working.

A British view of the present relations of Germany and the United States is set forth in the *Engineer*, London, which states:

The passage of the Patent and Designs bill, 1907, led some time ago to the report of contemplated retaliation on the part of the United States, whose patent law contains no provision for compulsory working. Already alarmed by the clause in the English act, and anxious to obviate similar action on the part of the United States, the German Government hastened to negotiate a reciprocal patent treaty with that country, and this was concluded a few months ago. Although the treaty was welcomed by the German newspapers and was suggested as the basis for the conclusion of a similar arrangement with France, it has not required many months to convince such an important association as the Verein Deuscher Maschinenbau Anstalten that the agreement is defective, at least so far as the machinery trades are concerned, and should not be repeated in the case of any other countries. The association, in the course of a petition to the Imperial Home Office in favor of an international regulation of the problem, points out that the treaty with the United States provided that compulsory working in one of the treaty states by the subjects of another treaty state shall only be applied to the extent of the limitation which the latter imposes upon its own subjects. As there is no compulsory working clause in the United States as compared with the existence of such a clause in Germany, the effect of the new treaty has been to place American subjects who own Teutonic patents in a more favorable position than the Germans themselves, as by the agreement compulsory working is not necessary in order to maintain the German patent so long as the United States patent law contains no provision for compulsory working.

It is quite conceivable that under the patent treaty in question it would be possible for American manufacturers to obtain a number of patents in Germany and not be under the obligation to work them. The Verein Deuscher Maschinenbau Anstalten submits that the advantage constitutes a great danger to German industry, as it will hamper work and the possibility of development. In particular, the danger threatens the machinery industry, which has not only to meet the severe American competition in the form of importation of complete machines, but in the case of special machines constructed in Germany it is possible to protect small constructive details by means of patents.

It thus turns out that the so-called reciprocal, in all events in the case of the machinery trades, may prove to be largely of a one-sided character, unless the United States reforms the patent law by introducing the necessity of compulsory working. As the case stands at present, Americans are able to obtain patents in both countries and prevent the Germans from them, and although the situation is not quite so unfavorable as the association would appear to think from the terms of the petition, there is no doubt that the Americans have gained the best of the bargain. It is now feared that other countries which have no system of compulsory working may also proceed to adopt the method, and it is therefore suggested that the German Government should endeavor to bring about an international agreement in respect of compulsory working, so that the condition of its application may be modified.

If reciprocity is not complete under the German treaty, the discrepancy is certainly no greater, to say the least, than that which exists in the relations of the United Kingdom and the United States in respect to the patent laws of the two countries. The German invention is protected in the United States, and the American invention in Germany without the necessity of working it. In the same manner the Englishman's invention is protected in the United States; but, on the other hand, the American must work his patent in Great Britain, else it may be revoked. Under our statutes, as they now stand, the American has the advantage of the German in that, while neither has to work his invention in the United States, the former is exempt from compulsory working in Germany. The German is not. However, it is held that before many years Congress must amend our law so as to include in it the compulsory working clause. When that time shall come the German's invention will be immune from the provision under the treaty; the American's will not, if the law is to apply to domestic as well as to foreign patents, as is the case in other countries. Nor will exception be made of the Englishman's patent. The Teuton will have the advantage over the Briton here, the American over the Briton in Germany, as he now has under the recently enacted treaty.

Sooner or later the problem will be regulated by an international agreement, and inventors of all countries of any importance will meet on a par everywhere. Such a condition of affairs would be more comfortable than the present chaotic differences, which tend to cause unpleasant industrial relations—in a small way, perhaps, but nevertheless to a degree that is irritating in many cases.

## Freight Rates and the Tariff.

The iron and steel industry was compelled to bear the brunt of the policy of downward revision which Congress followed in framing the Payne tariff act, and it is becoming evident that the railroads must bear a share of the consequences, if American mills are to retain control of the trade of the Pacific Coast and Texas. The future course of the market may also develop the necessity of a revision in rates on Southern iron to New England and points along or near the Atlantic Coast. Immediate interest, however, centers in the question of Transcontinental freight rates and the market of the Pacific Coast.

Foreign merchant iron was recently delivered in Portland at an ocean rate from the port of shipment of 8s., or $1.95, per ton. The overland rate from American mills

to Portland is 80 cents per 100 lb., or $16 per net ton. The European mill, with a freight rate of $2 per ton and customs duties of $6 per ton, has an advantage of $8, or 40 cents per 100 lb., over the American mill. Since the new tariff became effective, San Francisco jobbers have been able to buy foreign steel bars, delivered duty paid, at $1.60 per 100 lb. and structural shapes at $1.70. On merchant iron and steel, structural material and plates the overland rate from American mills is 80 cents to Pacific Coast terminals; on rails, $11 per gross ton, and on track fastenings 55 cents per 100 lb. To meet foreign competition on bars, structural material and plates, American mills would have to accept 80 or 90 cents at the mill, which is out of the question under present conditions of cost and market values.

The market of the Pacific Coast is peculiarly vulnerable to foreign competition in iron and steel products, on account of the low ocean rates that are always available from Europe. The usual rates are $3.50 to $5 per ton, but they are often reduced to nominal figures. California Washington and Oregon raise large crops of wheat, and the bulk of this crop goes to Europe around Cape Horn. Their export of lumber to Europe is also growing into large proportions. The tonnage of return traffic is light, and iron and steel products make very attractive ballast. It is not unusual for vessels to make ballast rates which barely cover the cost of loading and unloading and port charges, as in the case noted of the rate of 8s. per ton to Portland on merchant iron.

If American mills lose their large volume of business on the Pacific Coast, the Transcontinental railroads will sustain a double loss in traffic. Some years ago they began hauling lumber to Mississippi Valley points and the East at low rates merely to furnish lading for cars which otherwise would have to be hauled back empty across the Continent. This lumber traffic has grown to large proportions, and has proved very profitable. In fact, it has been responsible to a large degree for the enormous increase in the earnings of the Transcontinental roads in the past 10 or 12 years. The railroads, however, can only utilize in this traffic the cars that haul to the Coast iron and steel and other commodities from the East. Any loss in westbound traffic as a result of foreign competition on the Coast will mean a loss of $200 to $300 per car which the carriers receive for bringing back lumber to points east of the mountains. The railroads, therefore, find themselves in the same boat with the iron and steel industry, and a mutual sacrifice will be necessary if American mills and railroads are to continue in control of the iron and steel trade of the Coast.

With few exceptions, American manufacturers, especially of iron and steel, labor under a peculiar disadvantage in competing with European mills at tidewater. Our industries have grown up chiefly at inland points where the raw materials are found or are most economically assembled by rail or by the Great Lakes, and to reach the ocean long hauls are necessary, sometimes 1000 miles. In Europe manufacturing is concentrated along the seaboard, or along rivers and canals which afford cheap barge transportation to the ocean steamships. Where rail hauls are necessary to reach tidewater, the distance is usually short and the rates are very low, in harmony with the policy of European governments to promote exportation. In the course of time, perhaps in the very near future, this disadvantage will become a serious problem to the iron and steel industry in retaining control of trade along the Atlantic seaboard and the Gulf, as well as the Pacific. It will be one of the great problems of the immediate future in railroad management to adjust rates so as to minimize this difficulty.

## New Publication.

**Machine Shop Drawing.**—By Fred. H. Colvin, associate editor of the *American Machinist*. Size, 4½ x 7 in.; pages, 139; illustrations, 91. Price, $1. Publisher, the McGraw-Hill Book Company, New York City.

This little book has been brought out as a companion or accessory to "Machine Shop Calculations," by the same author. Unlike most books of the same or similar titles, its purpose is not to teach mechanical drawing, although it would be a considerable help to any one desiring to learn to become a draftsman, but instead its purpose is to assist those who have to handle drawings in the comprehending of them. In other words, it attempts to explain the reading of drawings. This it does in a clear and concise manner, beginning with the simpler forms and gradually working up to those of more complicated nature. Wherever it will help the reader perspective sketches are shown, and in the latter part, which pertains to isometric perspective sketches, it is emphasized how valuable this style of drawing is in showing at a glance the form of a part.

The examples of drawings which are given as representative of classes are a monkey wrench as one of the simplest, followed by parts of machinery, locomotives, boiler fittings, engine details, &c. A chapter on hints on laying out comes the nearest to giving actual instructions in the making of drawings, and, for example, treats of the laying out of sheet metal elbows, screw threads, &c. Closely allied are the three succeeding chapters, dealing with the laying out of spur and bevel gears and worms and worm wheels, constructing of tooth curves, &c. Tables which will be useful to the designer give proportions of dimensions. The last chapter has most to do with the making of sketches such as might be turned over directly to a blacksmith or other mechanic, many of them freehand, saving time in the drafting room and yet accomplishing the purpose quickly.

The book is one which can be read through in a comparatively short time and should be valuable as a reference work for the man who, not an expert, faces the necessity of conveying his ideas to the workman who is to reduce his mental conceptions to actual objects.

## Hudson-Fulton Historical Exhibit.

In connection with the Hudson-Fulton celebration in New York in the next two weeks, the American Society of Mechanical Engineers has arranged an exhibition in one of its rooms. It will include the following articles belonging to the society: Oil portrait of Robert Fulton by himself; original drawing of the Clermont by Robert Fulton and signed by him March 1, 1813; solid mahogany table formerly belonging to Robert Fulton; autograph brush drawing by Robert Fulton, 1797, illustrating an aqueduct for a high level canal; reproduction in bronze of the Fulton drawing of the steamer Potomac, 1820, prepared by the society; letters of Fulton's workmen concerning the first steamboat; photograph of West portrait of Fulton; portraits of naval and marine engineers, as Haswell, Loring, Thurston, Melville, See, Worthington, Ericsson, Watt, Holley and Stillman. The society has secured for the exhibit from the United Engineering Society the Ericsson models, and from the Smithsonian Institution the models of Fulton's Clermont, John Fitch's steamboat and John Stevens' Phœnix.

The Lehigh Valley inquiry for 3000 cars is divided equally among hopper and box cars and gondolas. The only other important inquiry reported pending is for 1000 ore cars for the Duluth & Iron Range. The Chicago Great Western has ordered 950 cars in addition to the 1500 recently reported. Recent locomotive orders include 34 for the Chicago Great Western from the Baldwin Locomotive Works and 27 for the Santa Fé from the same company.

## Customs Decisions.

### Iron Drums Used as Containers.

The Board of United States General Appraisers has settled a customs controversy regarding the classification of iron drums in which the Standard Oil Company, the Union Oil Company and the Pacific Creosoting Company have a direct interest. According to the Pacific Creosoting Company, the drums are what are known under the Dingley tariff as "usual" coverings for bringing in creosote oil. The Government, on the other hand, alleged that the drums cost about one-sixth more than the cost of the creosote which they contain; further, that the drums after being emptied of their contents are sold to the Standard and Union Oil companies approximately for what they cost the importing concern, who, in this case, appears as the protestant. General Appraiser Hay, who writes the decision for the board, overrules the contention of the Pacific Creosoting Company, and holds that the coverings are "unusual," as claimed by the Government.

Judge Hay says that there is no question regarding the classification of the creosote oil. The protesting company objects to the action of the Collector of Customs in assessing the drums as "manufactures of metal" with a duty of 45 per cent. Under the claim of the Pacific Creosoting Company the drums would pay at the same rate as the creosote oil. The decision says that in order to be held dutiable as "unusual" coverings, it must be shown that the coverings are not only unusual, but are designed for use otherwise than in the bona fide transportation of merchandise into this country. The drums in question are held to be in the above category and hence are "unusual."

It is developed by the testimony in the case that creosote oils is imported into some different ports of the United States. In nearly all of the ports it is imported in wooden barrels or casks, while at only four ports is the oil brought in in the drums. Two ports received the oil in tank vessels. During the fiscal year ending June 30, 1908, approximately two-thirds of all the creosote imported was brought in in tank vessels, approximately one-fourth was imported in wooden barrels and one-tenth in iron drums. It is also shown that prior to 1904 it had been imported in iron drums in but negligible quantities if at all. The fact that the value of the drum is one-sixth more than the value of the creosote contents is also brought out, as is the further circumstance that after being used the drums are sold to the Standard and Union Oil companies for what they cost the original buyers. In his decision overruling the claim of the Pacific Creosoting Company, Judge Hay says, in part:

> The fact that the drums cost more than the commodity which is imported in them, and that they are sold to the oil companies for approximately their cost, renders it, we think, quite conclusive that the drums in question are designed for use otherwise than in the *bona fide* transportation of the creosote. In other words, it is quite clear that if the importers did not have in mind and purpose the sale of these drums to the oil companies for the transportation of oil, they would not use them. For it is disclosed by the testimony that, were they not able to dispose of the drums at approximately the price they do, the creosote imported in them would be too expensive for the use to which it is put.

The decision points out that if at one port, for example, the creosote enters in drums and at practically all other ports in other coverings, those used at the single port must be regarded as "unusual." It is stated that more than 12,000 of the drums have already been purchased by the Standard Oil Company. Judge Hay says that if these drums are not dutiable as unusual coverings, thousands of them otherwise dutiable will enter into the commerce of this country and compete with similar articles of domestic manufacture upon terms not contemplated by the tariff law. The fact that little or no creosote was imported in iron drums prior to the passage of the administrative customs act of 1890 is another reason, in the opinion of the board, for overruling the importers' protest, and affirming the classification of the articles as "unusual."

### Aeroplanes.

The duty on aeroplanes will be 45 per cent. ad valorem, according to a Treasury ruling made public September 3. The new inventions are not mentioned in the Payne tariff law, but under the Treasury ruling they will be classified under the basket clause of the machinery schedule. This is on the assumption that the motor is the most valuable part of a flying machine.

### Cases to Come Up in the Courts.

With the opening of the United States Courts in October many tariff issues dealing with the metal industry will come up for hearing and determination. Practically all the important cases to be decided will be on the calendars of the Circuit Court and the Circuit Court of Appeals at New York. The Circuit Court will hold a special session to consider customs cases, while the Appellate Tribunal will hear such issues on the general calendar.

The Court of Appeals will decide the case of Edward M. Ackerson, which involves the classification under the Dingley tariff of steel window casements, with the various fittings attached. The articles are complete except that they are without glass and ready for placement in the masonry of the buildings for which intended. The importer contends that the Board of General Appraisers and the Circuit Court erred in holding the merchandise dutiable at 45 per cent. under the provision in the law for manufactures of metal. These tribunals held the articles dutiable as entireties. On the other hand, the importer will contend before the Appellate Court that only the fittings should be classified at 45 per cent., while the casements should have been returned for duty as "structural shapes and steel building forms," with a duty of 5-10 cent a pound.

Other issues to be heard in either the Circuit Court or the Appellate Tribunal include: Thomas Prosser & Son, steel grinding plates; Maldonado & Co., steel horseshoe calks; Herman Boker & Co., nickel coated wire; Hensel, Bruckmann & Lorbacher, steel ball bearings; Central Stamping Company, steel shapes in the forms of spouts, handles, &c.; Bloomingdale Bros., plated pins. The Circuit Court at Boston will take up the case of Wetherell Bros., involving the classification of saw plates.

**The Philadelphia Foundry Foremen's Meeting.**—The regular monthly meeting of the Associated Foundry Foremen of Philadelphia and vicinity was held on the evening of September 14 in Odd Fellows' Temple, Philadelphia, after an adjournment over the summer months. Nils Anderson of the Debevoise-Anderson Company, New York City, read a very interesting paper on "Solvay Coke." The paper brought forth a discussion which developed the fact that Solvay coke has been very successfully used in some of the local foundries this year, and it has been found that the amount consumed to melt the same quantity of iron can be reduced below the beehive coke usually required. The representative to the national convention made a formal report of observations, and a discussion followed as to the relative merits of the various types of molding machines and other foundry equipment on exhibition there. A discussion also took place on the effect of charging in the cupola limestone containing percentages of lime varying from 52 to 93 or 95 per cent. Two applications for active membership were received and accepted.

C. G. Hussey & Co., Pittsburgh, Pa., announce that they can make shipment from stock of their crimped sheet copper the day the order is received. Sheets with slight corrugations or crimps 3-16 in. from center to center, running crosswise of sheets, are made from sheets No. 24 gauge and lighter, not exceeding 36 in. in width nor 144 in. in length. The crimps improve the appearance of sheets for cornice work, &c., increase the rigidity of the material, but do not interfere with bending or forming. The length of sheet before crimping is 96 in.; length after crimping, 94 in.; size of crimp, 3-16 in.

## The Panama Scrap Bids.

WASHINGTON, D. C., September 18, 1909.—The Isthmian Canal Commission on Thursday opened proposals for the purchase of a large amount of old iron and steel now located in the canal zone on the Isthmus of Panama, including abandoned locomotives (dump cars, tanks, barges, boilers, girders, dredges, sheet iron, parts of old machinery and miscellaneous junk, "excepting such parts or portions thereof as from time to time prior to actual shipment from the isthmus, may be taken or reserved by the Isthmian Canal Commission or the Panama Railroad Company for use in the construction or operation of the Panama Canal or Panama Railroad." The commission also reserved all copper, brass, nickel and other metals than iron and steel, and all rails and easily detachable cast iron. The material embraces chiefly that taken over from the French company by the United States and found to be useless except as junk, and will be delivered by the commission at New York City, free of all charge, including tariff duties, deliveries to be completed in three years. It is estimated that the amount to be disposed of will be from 45,000 to 120,000 tons. The bidders and their proposals were as follows, the ton being the net ton of 2000 lb.:

Bidder 1. Block-Pollak Iron Company, Chicago, $8.77 per ton.

2. Philip Broomfield Company, Chelsea, Mass., $10.20 per ton.

3. W. A. Buxton Machinery Company, Worcester, Mass., $7.26 per ton.

4. Chicago House Wrecking Company, Chicago. A (certain material), $1,500,000. B (all material advertised), $10 per ton. C (certain material), $800,000. D (certain material), $700,000.

5. M. Cohen, St. Louis, Mo., $9.41 per ton.

6. Columbia Smelting & Refining Works, New York, $12.29 per ton.

7. Hirsch Rolling Mill Company, St. Louis, Mo., $7.68½ per ton.

8. Cal. Hirsch & Sons' Iron & Rail Company, St. Louis, Mo., A (all metal advertised), $11.16 per ton. B (all metal, but including brass, copper, &c.), $12.66 per ton. C, all copper, 13 cents per pound; brass, 8 cents per pound: remainder of scrap, $9.10 per ton. D (all metal advertised, but to be cut up by bidder), $11.66 per ton. E (all metal advertised, but to be cut up by commission to bidder's specifications), $13.70 per ton. F (all metal, but including brass and copper, cut to bidder's specifications), $14.66. G, locomotives, $8 per ton; dump cars, $11; dredges, $9; excavators, $10; bridge iron, $12; cranes, $12; boilers, $8; remainder of scrap, $8. H (all material advertised, but bidder to pay 6 cents per pound additional for all brass and copper taken off), $9.16 per ton. I (all material advertised, but bidder to return to commission 25 per cent. of all profit on brass, copper, &c.), $9.10 per ton. K (all material advertised, but including copper plates in fireboxes and brass boiler tubes), $12.16 per ton.

9. Henry A. Hitner's Sons Company, Philadelphia, $12.53 per ton.

10. International Iron & Metal Company, Newark, N. J., $10.13 per ton.

11. Joseph Joseph & Bros. Company, Cincinnati, $13.51½ per ton, with certain deductions to be made as specified in bid.

12. David Kaufman & Sons Company, Elizabethport, N. J., $9.41 per ton.

13. P. J. McArdle, Albany, N. Y., $10.20 per ton.

14. Ohio Iron & Metal Company, Chicago, $8.37½ per ton.

15. Panama Iron & Steel Company, Philadelphia, Pa., $10.06 per ton.

16. Maurice Rosenthal Investment Company, San Francisco, Cal., A (all material advertised), $17.20 per ton; B (all material advertised, but to be delivered where scrap is now located), $9.25 per ton.

17. Frank Samuel, Philadelphia, Pa., $10.11 per ton.

18. S. Salmonson, San Francisco, Cal., $18.80 per ton.

19. Samuel Spiro, Chicago, $10.61 per ton.

Probably a week or so may elapse before the award is announced. It will require some time to compare the bids in all their details, as well as to get official sanction to make the contract or contracts.

W. L. C.

The plant of the Standard Steel Car Company at New Castle, Pa., which has been idle for some months, was put in partial operation September 13, in the expectation that the demand for steel cars may so improve that it can be operated in full within a short time.

## The Protection of Mine Investors.

The Mining and Metallurgical Society of America, after long and careful consideration of the subject, has adopted the following resolutions:

*Whereas*, The overvaluation of mining properties by investors and the public, due to ignorance of mining conditions and a lack of appreciation of the real nature of the investment, tends to increase unduly the profits of mine promoters and speculators, and to increase unnecessarily the financial risks taken by mine investors, to the ultimate disadvantage of the mining industry;

*Resolved*, That it is the opinion of the Mining and Metallurgical Society of America that, for the protection of shareholders and investors, every mining company should publish an annual report within 90 days of the close of its fiscal year, and such report should incorporate the following information:

1. A brief review of the past history of the property, the work accomplished and the results obtained, with tabulated statement of expenditures and receipts from the beginning, marketable products made each year, and the sums received from the sale of same, the annual net earnings and the disposition made of such earnings.

2. A similar review, but in more detail, of the work of the year, with statements of the assets and liabilities (these statements to show all details as to capitalization of the company; the number and classes of shares outstanding at date of the report; the respective rights of these shares; the number of shares remaining in the treasury; any options or contracts on such shares; any bonded indebtedness), receipts and disbursements, cost sheet and other information as to work accomplished and results obtained.

3. A statement of ore reserves at the date of the report, compared with the reserves of the previous year, with an estimate, by competent authority, of the probable life of the mine.

If publicity was ever needed regarding enterprises in which the public is interested, it has been most emphatically desirable in the case of mining companies. The Mining and Metallurgical Society of America should receive such prompt and enthusiastic support in its "opinion," as above stated, that mining companies not making full reports will feel the force of adverse public sentiment.

## The Youngstown Sheet & Tube Company's New Blast Furnace.

Contracts for the new furnace to be built by the above named company at Youngstown, Ohio, have just been placed. The William B. Pollock Company, Youngstown, will build all the iron work for the stack, which will be of the same proportions as the present two furnaces, 88 ft. high and 22 ft. bosh. It will be equipped with four Kennedy center combustion hot blast stoves, each 22 x 100 ft., and which will also be built by the William B. Pollock Company. The blowing engines will be furnished by the William Tod Company, Youngstown; the firebrick by the Niles Firebrick Company, Niles, Ohio; the Hoover & Mason Company, Chicago, will build the coke, ore and limestone bins; the Otis Elevator Company will furnish the hoisting engine and the electrical apparatus, and the Babcock & Wilcox Company will furnish six 500-hp. boilers and also six smaller boilers to be installed in the puddling mill.

The new furnace will have a daily capacity of 500 tons, which will give the Youngstown Sheet & Tube Company a total daily capacity of 1500 tons of Bessemer pig iron. Its six sheet mills have been operating full time for several weeks, and all traces of the recent strike have disappeared. The company is at work on the building of eight more hot mills and two stands of cold mills, which will give it a total of 14 hot mills and five cold mills. Every department of the large works, comprising two blast furnaces, Bessemer steel plant, pipe, sheet and skelp mills and billet and sheet bar mills, is in full operation, with a very large amount of business booked.

**Industrial Growth in Southern Utah.**—The most important development in the present rapid extension of electric power and lighting throughout Utah is the organization, with ample capital, of the Thor Power Company, Mark Anderson, secretary, Salt Lake City, which will cover the southern part of the State with a network of transmission lines from power stations at Six Mile Canyon and Salina. Machinery requirements will be very considerable, and a number of important industrial plants are projected for that section.

# NEWS OF THE WORKS.

### Iron and Steel.

In the recent item in this column concerning the improvements to the plant of the Portsmouth Steel Company, at Portsmouth, Ohio, the statement that the company intends to erect four new tin plate mills is erroneous. The company has not had under consideration the installation of tin plate mills.

No. 1 furnace of the Andrews & Hitchcock Iron Company, at Hubbard, Ohio, which is now being rebuilt and extensively remodeled, is expected to be ready for blast about January 1. No. 2 furnace of this company is in operation, turning out about 300 tons of Bessemer iron per day.

S. M. Wetmore has been appointed receiver for the Damascus Tool Steel Company, whose plant is located at Carnegie, Pa.

The Bon Air Coal & Iron Company, Bon Air, Tenn., is preparing to make some improvements at its furnace plant, in the way of new stove, &c.

The Sloss-Sheffield Steel & Iron Company now has in operation six out of seven blast furnaces, the idle stack being at Florence, Ala.

The Tennessee Coal, Iron & Railroad Company now has in blast four out of five furnaces at Bessemer, Ala. All these stacks, as well as the Alice Furnace at Birmingham, are making foundry iron.

No. 2 furnace of the Birmingham Coal & Iron Company, Vanderbilt, Ala., will probably be put in blast about October 15. No. 1 furnace at the same plant will then be blown out.

Repairs to all furnaces of the Southern Iron & Steel Company are being rushed, and the Chattanooga, Tenn., plant will probably be ready for operation November 15.

The Sheffield Coal & Iron Company, Sheffield, Ala., will probably have one blast furnace in operation by October 1.

The Republic Iron & Steel Company will probably have an additional blast furnace in operation at Thomas, Ala., by October 1.

The blowing in of the Jefferson Iron Company's blast furnace at Jefferson, Texas, scheduled for the first half of September, has been deferred until the first week in October.

The Ohio Falls Iron Company, New Albany, Ind., has begun operating on full time in all departments. A large number of orders have been received, which assures steady employment to 500 workmen.

### General Machinery.

The Emergency Forge Company, a new industry capitalized at $100,000, is building a shop at Lansing, Mich., for the manufacture of a general line of forgings. The plant, which will be of steel construction, is located in the manufacturing district adjacent to the Manufacturers' and Grand Trunk railroads, and it will probably be in readiness for operation within 60 days. The machinery equipment, it is stated, has already been purchased. The plant will have a capacity of 10 power hammers ranging in sizes from 800 to 3000 lb., six of which will be delivered at the works before October 1. Although a large amount of business will be supplied by the automobile plants of Lansing, the company has already booked a considerable volume of business from outside sources. James B. Seager is president; S. F. Downey, vice-president; S. F. Seager, secretary and treasurer, and A. F. Moleton, general manager.

The Mallary Machinery Company, Macon, Ga., has been incorporated by F. L. Mallary and others.

The city of Dallas, Texas, will open bids November 10 for a 15,000,000-gal. pumping engine for the water works pumping station at the White Rock reservoir.

George T. Ladd, Farmers' Bank Building, Pittsburgh, has sold six horizontal watertube boilers, manufactured by the Bass Foundry & Machine Company, to the Pennsylvania Railroad. The installation will be made on the lines west of Pittsburgh, the boilers being installed at Dola, Grafton and Millbrook, Ohio. For the Taylor Engineering Company, a 100-ton concentrating mill, including buildings and equipment, has been contracted for, to be installed by the Silver Cliff Mining Company, Cobalt, Ontario. Mr. Ladd has also sold about 500 tons of wheels for heavy rope drive to the Phillips Sheet & Tin Plate Company, Clarksburg, W. Va.; National Tube Company, for the Lorain, Ohio, plant, and the Ontario Iron & Steel Company, Ontario, Canada.

The Port Henry Iron Company, Port Henry, N. Y., will install a new ore crushing plant.

The Munich Machine Company, Munich, N. D., has been incorporated by W. L. Burdick, A. W. Huss and A. U. Peterson. Some new tools will be purchased.

The Howard Safe & Vault Company, Atlanta, Ga., will build a large new plant this winter, the capital stock of the company having been increased to $500,000 for this purpose. Iron working machinery in considerable quantity will be required before spring.

Recent contracts received by the Buffalo Forge Company, Buffalo, N. Y., include: The W. P. Story Building, Los Angeles, Cal., 12 x 18 x 12 in. tandem compound engine and a 12 x 20 x 14 in. compound engine for direct connection to generators; Atlantic Terminal of the Erie Railroad, 10 x 10 in. horizontal engine for a 25-kw. lighting set; Allis-Chalmers Company, Milwaukee, Wis., four double vertical engines; United States Navy Yard at New Orleans, 12 x 12 in. vertical engine driving a 50-kw. generator; Fairbanks, Morse & Co., 14 x 15 in. horizontal engine for driving a 100-kw. generator at the Michigan Sugar Company; United States Government, for direct connection to generators, two 16 x 17 in. horizontal engines for Fort Scott, two 14 x 15 in. horizontal engines for Fort Casey, and two 12 x 13 in. engines for Fort Stevens; Indian Refining Company, Georgetown, Ky., 14 x 14 in. engine, belt drive; Great Lakes Engineering Works, Detroit, Mich., 6 x 8 in. marine type engine for direct connection to a 15-kw. generator; Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., 10 x 10 in. vertical engine for generator; College of Hawaii, Honolulu, eight down draft forges, arranged in pairs, a Buffalo armor plate combined punch and shear, and steel pressure blower and exhauster; A. T. Demarest & Co., New York, eight down draft forges, two volume blowers and two steel plate exhausters; Burgess Sulphite Fiber Company, Berlin, N. H., large steel plate exhauster and a 10 x 12 in. engine; Eastern Tanners' Glue Company, Gowanda, N. Y., three large fans with heaters and a 10-in. centrifugal pump with direct connected Buffalo engine; Hamilton Steel & Iron Company, Ontario, two fans with direct connected engines; White Oak Mine at Archbold, Pa., a special multivane steel plate fan, to be used for forced draft; Anaconda Copper Mining Company of Montana, large fan wheel; Clarkson School of Technology, Potsdam, N. Y., an exhauster for ventilating laboratory; Elk Tanning Company, New York, seven small drying outfits, each with heater and engine driven fan; John G. Sutton Company, apparatus for San Francisco schools; Hollingsworth & Whiting Company, Boston, Mass., large steel plate fan with necessary heaters and two 7 x 12 in. horizontal engines for heating the grinder room, screen room, wet machine room, &c., in its new paper mill at Madison, Maine; J. H. & C. K. Eagle Company, steel plate fan with heater, and an 8 x 8 in. horizontal engine for dye house at Shamokin, Pa.; the company has also recently sold considerable forge shop equipment and heating and ventilating apparatus to various schools and colleges.

The Titusville Forge Company, Titusville, Pa., is building an addition to its machine shop, 60 x 120 ft., to be equipped with modern machinery for the economical and accurate production of forgings, particularly crank shafts of all weights. All steel will be handled by electric cranes and magnets. The equipment will include oil burning furnaces and hardening baths. This addition will increase the capacity for heavy work, and the company is now able to handle forgings up to 80,000 lb. in weight. The capacity for grinding automobile crank shafts and cams will also be increased.

Boiler, engine and sawmill machinery will be purchased this fall by L. F. Howell, St. Petersburg, Fla., for a new timber cutting plant.

The Boston & Maine Railroad has let contract for the construction of a roundhouse at Fitchburg, Mass., and is planning an extension to the car repair shop, doubling its size, and the building of a storehouse, modern painthouse and a transfer table. The three tracks for the passenger station to the east yard is now under construction.

Walter Dunn, Ogdensburg, N. Y., has purchased property on Main street, and is planning on erecting a foundry, machine shop and warehouse building in connection with a proposed plant for the manufacture of engines.

### Foundries.

The Bolivar Foundry & Machine Company, Bolivar, Pa., is erecting a new foundry which is expected to be ready for operation within the next 30 days. The molding floor is 43 x 100 ft., with engine room, 20 x 50 ft.; cupola room, 20 x 30 ft.; coreroom, 20 x 20 ft., with two core ovens and cleaning and chipping room. The buildings are of brick and steel, and will be equipped with a 10-ton cupola and 10-ton traveling crane for the foundry. Ground has not yet been broken for the new machine shop to be built by the company, its present machine business being conducted in its old buildings. The company will have railroad siding to its new works, connecting with the main line of the Pennsylvania Railroad at Bolivar, and will make a specialty of general jobbing and repair work of all kinds, and may also take up the manufacture of some special line of machinery in the near future.

The American Motor Castings Company, Detroit, Mich., will build and equip a plant at Marston court and Morrow street. The foundry will be 133 x 220 ft., one story, and the machine shop 87 x 261 ft., two stories.

From Fremont, Neb., it is reported that the Fremont Foundry & Machine Company has commenced work on an addition which will double its capacity.

Joseph Sawyer, Oswego, N. Y., whose brass foundry was recently destroyed by fire, is now having plans prepared for a new building which he proposes to erect on the present site.

### Bridges and Buildings.

Among the recent fabricating contracts secured by the Des Moines Bridge & Iron Company, Des Moines, Iowa, are 500 tons

of steel for the Realty & Securities seven-story building, Des Moines; 500 tons for an extension to the Des Moines Edison plant; the National Realty Company building, a 20-story structure at Tacoma, Wash., calling for 900 tons, and material for the construction of a large power house for the Power Construction Company, Galena, Ill. The company is also building a 250-ft. wood piling crane for the Minnesota & Ontario Power Company at International Falls, Minn.

The Keystone Tube Works, Pittsburgh, which is building a new plant at Queens Junction, Pa., a recently established industrial town, has placed a contract for the steel buildings with the Penn Bridge Company, Beaver Falls, Pa. The main building will be of heavy steel construction, about 80 x 207 ft., with crane runways, and will have lean-tos attached. There will be several smaller buildings, for the manufacture of tubes used in bedsteads and for other purposes.

The contract for the metallic furniture, bronze and other ornamental work for the new Cuyahoga County Court House in Cleveland, amounting to $118,815, has been awarded by the County Building Commission to the Art Metal Company, Jamestown, N. Y.

The Erie County Electric Company, Erie, Pa., has let contract for the construction of a power house to the Cleveland Fireproof Construction Company, Cleveland, Ohio.

The Commissioners of Dearborn County, meeting at Lawrenceburg, Ind., will let contracts for several bridges October 4. W. S. Fagaly is county auditor.

The Commissioners of Noble County, meeting at Albion, Ind., will let contracts for bridges and bridge repairs October 5. John W. Earle, Albion, is county auditor.

The Commissioners of Orange County, meeting at Paoli, Ind., October 5, will let the contract for an 80-ft. span tubular bridge. A. B. Ham, Paoli, is county auditor.

The Commissioners of Davies County, meeting at Washington, Ind., October 5, will let contracts for several bridges. Thomas Nugent, Washington, is county auditor.

The commissioners of Miami County, meeting at Peru, Ind., October 7, will let contracts for 10 bridges. Charles Griswold, Peru, is county auditor.

**Power Plant Equipment.**

The Interstate Construction Company, Galena, Ill., is building a new power plant the equipment for which will comprise two direct connected cross compound condensing units, one of 1000 and one of 1500 kw. capacity. Steam for this plant will be generated by four 400-hp. Edgemoor water tube boilers. The company also has a plant at Plattsville, Wis., but it is understood that current will be transmitted to this place from the new plant when completed.

The Butler Engine & Foundry Company, Butler, Pa., contemplates installing a system of motor drive.

A. B. Meiner, Sedan, Okla., will purchas a boiler feed pump and heater.

The Hammond Lumber Company, Astoria, Ore., is arranging to install two 800-kw. turbo-generator sets with condensers, transformers and other auxiliary equipment, the intention being to use exhaust steam from the sawmill when in operation and direct steam when the mill is not working. This equipment will be installed in a reinforced concrete building.

The city of Spokane, Wash., will receive bids until October 8 for the following equipment, the plans and specifications for which are on file with the Board of Public Works: Three 5,000,000-gal. multi-stage centrifugal pumps, one 650-hp. horizontal water wheel, three induction motors, switchboard and connection.

James E. McNary, Pittsburgh representative of the Clark Brothers' Engine Company, has been awarded the contract for installing three units in the Pittsburgh Athletic Club Building. The contract calls for three high-speed Corliss engines of 75, 100 and 150 kw. capacity, respectively. The engines are to be direct connected to Crocker-Wheeler generators in the light and power plant of the building. There was possibly more competition on this contract than any that has been awarded in the Pittsburgh District for some time, as all makers of engines of this class were anxious to make an installation in the new clubhouse, as much for the advertisement it would afford as for the financial benefit.

The C. & G. Cooper Company, engine builder, Mount Vernon, Ohio, through its Pittsburgh office, has been awarded a contract by the Republic Iron & Steel Company for a 900-hp. cross compound condensing engine, to be direct connected to a 600-kw. direct current generator, to be installed in the new pipe mills being erected by the latter company at Hazelton, Ohio.

The Detroit United Railway Company, Detroit, Mich., is arranging to build and equip a large power house at Milwaukee avenue and Dubois street. F. W. Brooke is general manager.

The power plant of the Sigourney (La.) Electric Light & Power Company will be remodeled and some new machinery installed.

Clark & Davy, Richlands, Va., will erect a power and light plant, to be engine driven.

Additional electrical equipment will be purchased in October or November by the Anderson (S. C.) Water, Light & Power Company for its generating station at Portman Shoals, which will be considerably increased in capacity.

The Coventry Company, Anthony, R. I., will put in a new steam turbine plant of 800 to 1000 hp.

The Franklin Wheel Company, Franklin, Ohio, has decided upon the purchase of a direct current generator of about 40 hp.

A large number of alternating current motors are to be installed within the next few months by the Everett-Metzger-Flanders Company, Detroit, Mich., together with power plant equipment for operating them.

The Birmingham Water, Light & Power Company has been organized by W. L. Friel, Birmingham, Ala., to supply nearby towns. It will be in the market before long for pumping machinery and later for engines and electrical apparatus.

A pumping plant for East Youngstown is contemplated by the Youngstown, Ohio, authorities.

The Simonds Mfg. Company, Chicago, Ill., is arranging for the installation of a new electric power unit and accessory machinery.

Boilers, Corliss engine and power transmitting machinery will be required this winter by the Portland Flouring Mills Company for a new plant at Walla Walla, Wash.

One or more pumping engines or turbine pumps will be purchased after January 1 by the Board of Public Works, Tacoma, Wash., for the station at Maplewood Springs, if the recommendation of the special water committee is followed.

A new Corliss engine will probably be bought in December for the municipal power plant at Blaine, Wash., together with electrical apparatus.

An engine and dynamo will probably be installed this winter by the Ohio Stave & Lumber Company, Guerdon, Ark., for lighting its plant.

The Shenango Furnace Company is preparing to install a new Corliss engine and electric generator at Hibbing, Minn.

**Fires.**

The plant of the Bath Foundry & Machine Company, Bath, Pa., was damaged $25,000 by fire September 16.

Five buildings of the Buckman & Keen Japanning Company, manufacturer of patent leather, Woburn, Mass., were burned September 19, the loss being estimated at about $50,000.

The plant of the Globe-Taunton Mfg. Company, Taunton, Mass., was burned September 10, the loss being about $40,000.

The plant of the Kensington Wagon Company, Philadelphia, Pa., was damaged $15,000 by fire September 18.

**Hardware.**

The Keystone Nail Company, Pittsburgh, plant at Rochester, Pa., making galvanized cut and wire nails, reports that the additions made to its plant last May, which doubled its capacity, are now being operated full time.

The Simplex Nut Lock Company has been incorporated at Scranton, Pa., and may occupy a plant near the old Dixon works.

The O. U. Handy Tool Company has been organized at Indianapolis, Ind., with $10,000 capital stock, to manufacture tools and machinery. The directors are Louis A. Browne, W. W. Spencer and E. W. Spencer.

The F. & N. Lawn Mower Company, Richmond, Ind., which was burned last spring, is being rebuilt.

**Miscellaneous.**

The Sterling Machine & Stamping Company has moved its plant from Vermillion to Wellington, Ohio, where it opened its new works with a full complement of men this week. The new quarters will provide ample facilities for its line of special manufacturing, sheet metal stamping and pressed steel parts. The company, which is favorably known and is one of the leading manufacturers of gas generators, tire lugs and other automobile accessories, also operates a stamping department, producing parts of every description from sheet metal and brass, many parts formerly cast now being produced successfully in stamping. In connection the company operates an electroplating department, which enables it to manufacture articles ready for the market. A new feature will be a brass foundry equipped for handling jobbing work. The company now has on hand many unfilled orders and anticipates a much larger business in the near future which it will have facilities to take care of in its new plant.

The plant of the Jenks & Muir Mfg. Company, Detroit, Mich., manufacturer of iron and brass bedsteads and woven wire and coil springs, is being enlarged by the addition of a four-story building, 65 x 200 ft., to be used for manufacturing and storing purposes. With the exception of six new cotton felt machines, the new building will be equipped with machinery transferred from other parts of the plant.

Pumping machinery for a water and sewage system is to be purchased in December or January by Jacksonville, Ore. At Gold Hill, Ore., work on a water supply plant will begin this fall.

The water works at Omaha, Neb., which are owned by a private corporation, will be purchased by the city and extensively improved. One of the engines in the existing station, which was designed by Edwin Reynolds, holds a notable record for economy.

# The Iron and Metal Trades

## Heavy Buying of Pig Iron.

### Advancing Prices in All Markets.

Under a new outburst of activity in the pig iron market, the week has been marked by large business, advancing prices and some indications that the pace is too rapid. Expectations entertained for 1910, which in many quarters are held to be of the brightest, are an important factor in the movement, as well as the very strong evidences of prosperity furnished by current mill operations.

Steel making pig iron has been heavily bought by independent steel companies in the Central West, but thus far the Steel Corporation has not been a buyer, though its steel ingot production is in excess of the best records of 1907. The steel companies are in every case buying iron which will go as rapidly as possible into rolled product sold for delivery this year. There is no sign of anticipatory buying of steel making irons. The sales in the Pittsburgh and Valley districts include 20,000 tons to one steel company at $17.50, at Valley furnace; 10,000 tons to another at the same price, and 3000 tons to a third, while 15,000 tons was taken by an ingot mold foundry. Deliveries are all for this year. In addition a Buffalo steel company has made a conversion deal with a local furnace for 25,000 tons of Bessemer iron.

The demand for basic pig iron in eastern Pennsylvania, in spite of further heavy sales, including one lot of 12,000 tons, is still unsatisfied. Whereas $18, delivered in eastern Pennsylvania, was the basis of transactions last week, higher prices are now paid and $18.50 is asked for delivery in the first quarter of 1910. Makers are little inclined to sell far ahead, but some eager inquiries for the first half have appeared, and in one case a large lot is called for for delivery over the entire year.

Important foundries in various districts have been in the market in the past week, including large machinery and cast iron pipe interests. Sales are reported at Chicago amounting to 30,000 tons, while Cincinnati did a very heavy business in Northern and Southern irons, and in Eastern markets upward of 75,000 tons was closed, New England foundries participating largely. Southern irons have advanced to $14, Birmingham, for No. 2 foundry, while some makers ask $14.50 for this year. The advance on foundry grades has been about 50 cents in all markets.

Pig iron importations are looked to at this juncture to put a curb upon the advances. One cargo of Middlesbrough No. 3 has been sold to an Eastern consumer at $17.50, duty paid, and there are further negotiations. Expectations of American buying are having the usual effect on the British market, Middlesbrough warrants reaching 51 shillings 7½ pence to-day, which is the highest price on the present movement.

Coke is advancing in a spectacular way. A contract for Connellsville furnace coke covering all of 1910 has been closed at $2.90 at the ovens. The whole raw material situation is under strain. To help out Eastern furnaces further imports of foreign ore to the amount of 100,000 tons have been arranged for in the past week, the ore to come in this year. Intimations have been given from lake ore sellers that an advance in prices would be made for next year, probably to the basis of 1907, or 50 cents above the early price this year.

Steel melting scrap in the East has moved in line with basic pig iron. The steelmakers supplied through a single agency have purchased considerably above 100,000 tons in the past 10 days, much of it at $18, delivered, though independent manufacturers have secured scrap at $17.50. Importations of basic and Bessemer crops are coming from the Middlesbrough District, one sale of 5000 tons being reported.

Finished material markets are of secondary importance this week. Only scattering rail sales are reported. Chicago District mills have now booked 350,000 tons for 1910 and are negotiating further contracts amounting to 200,000 tons.

New structural business is still light. In New York City two buildings were placed requiring 9000 tons. The long planned free bridge over the Mississippi River at St. Louis, about 15,000 tons, will soon be ready for bids.

Bar mills are making enormous outputs. Sheet and tin plate operations are on a larger scale, and the Steel Corporation may soon start the Columbus steel plant, the last on the list, on sheet bars.

The cast iron pipe trade is showing new life. Atlanta, Ga., will buy 20,000 tons and Macon, Ga., will be in the market for large requirements. The fall and winter are expected to be quite active and prices tend upward.

## A Comparison of Prices.

**Advances Over the Previous Month in Heavy Type, Declines in Italics.**

At date, one week, one month and one year previous.

| | Sept. 22, 1909. | Sept. 15, 1909. | Aug. 25, 1909. | Sept. 23, 1908. |
|---|---|---|---|---|
| **PIG IRON,** Per Gross Ton: | | | | |
| Foundry No. 2, standard, Philadelphia | **$18.25** | $18.00 | $17.25 | $16.75 |
| Foundry No. 2, Southern, Cincinnati | **17.75** | 17.25 | 16.75 | 15.75 |
| Foundry No. 2, local, Chicago | **19.00** | 18.50 | 17.50 | 16.85 |
| Basic, delivered, eastern Pa. | **18.00** | 18.00 | 17.50 | 16.00 |
| Basic, Valley furnace | **16.00** | 15.75 | 15.25 | 14.25 |
| Bessemer, Pittsburgh | **18.40** | 17.90 | 17.40 | 15.90 |
| Gray forge, Pittsburgh | **16.40** | 15.90 | 15.65 | 14.40 |
| Lake Superior charcoal, Chicago | 19.50 | 19.50 | 19.50 | 19.50 |
| **BILLETS, &c.,** Per Gross Ton: | | | | |
| Bessemer billets, Pittsburgh | **25.00** | 25.00 | 24.50 | 25.00 |
| Forging billets, Pittsburgh | **29.00** | 29.00 | 28.00 | 27.00 |
| Open hearth billets, Philadelphia | **27.60** | 27.50 | 27.00 | 26.20 |
| Wire rods, Pittsburgh | **31.50** | 31.50 | 31.00 | 33.00 |
| Steel rails, heavy, at mill | 28.00 | 28.00 | 28.00 | 28.00 |
| **OLD MATERIAL,** Per Gross Ton: | | | | |
| Steel rails, melting, Chicago | **16.50** | 16.50 | 16.00 | 14.75 |
| Steel rails, melting, Philadelphia | **17.50** | 17.25 | 17.00 | 15.90 |
| Iron rails, Chicago | 19.00 | 19.00 | 19.00 | 18.00 |
| Iron rails, Philadelphia | **20.50** | 20.00 | 19.75 | 20.50 |
| Car wheels, Chicago | **18.50** | 18.50 | 17.00 | 15.25 |
| Car wheels, Philadelphia | **17.00** | 17.00 | 16.00 | 15.00 |
| Heavy steel scrap, Pittsburgh | **17.50** | 17.50 | 16.75 | 14.25 |
| Heavy steel scrap, Chicago | **16.00** | 16.00 | 15.50 | 13.00 |
| Heavy steel scrap, Philadelphia | **17.25** | 17.25 | 17.00 | 15.00 |
| **FINISHED IRON AND STEEL,** | | | | |
| Per Pound: | Cents. | Cents. | Cents. | Cents. |
| Refined iron bars, Philadelphia | **1.55** | 1.52 | 1.47 | 1.45 |
| Common iron bars, Chicago | **1.50** | 1.45 | 1.40 | 1.50 |
| Common iron bars, Pittsburgh | 1.50 | 1.50 | 1.50 | 1.40 |
| Steel bars, tidewater, New York | **1.56** | 1.56 | 1.51 | 1.56 |
| Steel bars, Pittsburgh | **1.40** | 1.40 | 1.35 | 1.40 |
| Tank plates, tidewater, New York | **1.66** | 1.66 | 1.56 | 1.76 |
| Tank plates, Pittsburgh | **1.50** | 1.50 | 1.40 | 1.60 |
| Beams, tidewater, New York | **1.66** | 1.66 | 1.56 | 1.76 |
| Beams, Pittsburgh | **1.50** | 1.50 | 1.40 | 1.60 |
| Angles, tidewater, New York | **1.66** | 1.66 | 1.56 | 1.76 |
| Angles, Pittsburgh | **1.50** | 1.50 | 1.40 | 1.60 |
| Skelp, grooved steel, Pittsburgh | 1.40 | 1.40 | 1.40 | 1.45 |
| Skelp, sheared steel, Pittsburgh | 1.50 | 1.50 | 1.50 | 1.50 |
| **SHEETS, NAILS AND WIRE,** | | | | |
| Per Pound: | Cents. | Cents. | Cents. | Cents. |
| Sheets, black, No. 28, Pittsburgh | 2.20 | 2.20 | 2.20 | 2.50 |
| Wire nails, Pittsburgh* | 1.80 | 1.80 | 1.80 | 1.95 |
| Cut nails, Pittsburgh | 1.75 | 1.75 | 1.75 | 1.80 |
| Barb wire, galv., Pittsburgh* | 2.10 | 2.10 | 2.10 | 2.40 |
| **METALS,** Per Pound: | Cents. | Cents. | Cents | Cents. |
| Lake copper, New York | 13.50 | 13.50 | 13.50 | 13.75 |
| Electrolytic copper, New York | *13.00* | 13.00 | 13.25 | 13.37½ |
| Spelter, New York | 5.85 | 5.85 | 5.85 | 4.75 |
| Spelter, St. Louis | 5.70 | 5.70 | 5.70 | 4.60 |
| Lead, New York | *4.38* | 4.40 | 4.40 | 4.50 |
| Lead, St. Louis | *4.30* | 4.30 | 4.32½ | 4.35 |
| Tin, New York | *29.15* | 29.90 | 30.45 | 28.75 |
| Antimony, Hallett, New York | **8.30** | 8.37½ | 8.00 | 7.75 |
| Nickel, New York | 45.00 | 45.00 | 45.00 | 45.00 |
| Tin plate, 100 lb., New York | $3.64 | $3.64 | $3.64 | $3.89 |

* These prices are for largest lots to jobbers.

## Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural steels and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

**Structural Shapes.**—I-beams and channels, 3 to 15 in., inclusive, 1.50c., net; I-beams over 15 in., 1.60c., net; H-beams over 8 in., 1.70c.; angles, 3 to 6 in., inclusive, ¾ in. and up, 1.55c., net; angles, over 6 in., 1.60c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.70c., base, half extras, steel bar card; tees, 3 in. and up, 1.60c., net; tees, 3 in. and up, 1.55c., net; angles, channels and tees, under 3 in., 1.45c. base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.75c., net; hand rail tees, 2.75c., net; checkered and corrugated plates, 2.75c., net.

**Plates.**—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.50c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered ¼-in. plate. Steel plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

| | |
|---|---|
| Gauges under ¼-in. to and including 3-16-in. plates on thin edges | $0.10 |
| Gauges under 3-16-in. to and including No. 8 | .15 |
| Gauges under No. 8 to and including No. 9 | .25 |
| All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.) | .10 |
| Complete circles | .20 |
| Boiler and flange steel plates | .10 |
| "A. B. M. A." and ordinary firebox steel plates | .20 |
| Still bottom steel | .30 |
| Marine steel | .40 |
| Locomotive firebox steel | .50 |
| Shell grade of steel is abandoned. | |
| For widths over 100 in. up to 110 in | .05 |
| For widths over 110 in. up to 115 in | .10 |
| For widths over 115 in. up to 120 in | .15 |
| For widths over 120 in. up to 125 in | .25 |
| For widths over 125 in. up to 130 in | .50 |
| For widths over 130 in | 1.00 |

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh

**Sheets.**—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, No. 10 and heavier, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 2.05c.; box annealed sheets, Nos. 17 to 21, 2c.; Nos. 22 to 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c.; galvanized sheets, Nos. 13 and 14, 2.25c.; Nos. 15 and 16, 2.35c.; Nos. 17 to 21, 2.50c.; Nos. 22 to 24, 2.65c.; Nos. 25 and 26, 2.85c.; No. 27, 3.05c.; No. 28, 3.25c.; No. 29, 3.35c.; No. 30, 3.60c. Painted roofing sheets, No. 28, $1.55 per square. Galvanized roofing sheets, No. 28, $2.80 per square for 2½ in. corrugations.

**Wrought Pipe.**—Discounts on steel pipe, ¾ to 6 in., in carloads to the largest trade, are 81 and 5 per cent. off list, and on iron pipe, ¾ to 6 in., are 75 and 5 per cent. off list.

**Boiler Tubes.**—Regular discounts are as follows:

*Boiler Tubes.*

| | Steel. |
|---|---|
| 1 to 1¼ in. | 50 |
| 1¾ to 2¼ in. | 62 |
| 2¾ to 5 in. | 70 |
| 2½ in. | 64 |
| 6 to 13 in. | 62 |

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

**Wire Rods.**—Bessemer, open hearth and chain rods, $31.50 to $32.

**Steel Rivets.**—Structural rivets, 1.90c., base; boiler rivets, 2c., base, subject to usual extras.

## Chicago.

FISHER BUILDING, September 22, 1909.—(*By Telegraph.*)

In the midst of a market very active in all lines of finished iron and steel, particular interest attaches to the booking of rail contracts for 1910, which at present constitutes the most conspicuous movement in new buying. The rapid filling up of mills on this as well as other products has emphasized the necessity of placing contracts well in advance of actual needs. Including new orders of considerable size secured last week by the Illinois Steel Company, this interest has already entered 350,000 tons for 1910 delivery. From inquiries of like character now in the market from Western roads it is assumed that further purchases of not less than 200,000 tons will soon be made. It is evident from the concern manifested by prominent shippers that serious inconvenience from delays in transportation is likely to be encountered before long. The number of idle cars is steadily decreasing, and it is estimated that of those included in the figures now reported a liberal percentage is unfit for actual service. In addition to the constantly increasing volume of merchandise to be moved, more cars will be needed to handle the enormous crops yet to be marketed. In view of the situation as it now appears, there is every likelihood of a car shortage within the next 60 days, which will, to a greater or less extent, interfere with the prompt movement of shipments. In spite of a record breaking production of steel there is not only no local surplus for the open market, but makers are hard pressed to supply their own finishing departments. The product of the new billet mill of the Gary Works will relieve the stress somewhat, so far as the mills of the leading interest are concerned. Due to the overcrowded condition of mill capacities and consequently slow deliveries, consumers of bars, plates, shapes and sheets are in turn finding it difficult to keep their contract engagements in turning out work. Structural fabricating plants are in many cases unable to keep their shops going full because of lack of material. The mills generally are not booking orders beyond January 1. While only a moderate amount of new business is being placed, specifications continue to come in at a rate that renders it impossible for producers to make any headway in shortening delivery dates, which are now anywhere from 6 to 10 weeks ahead on all leading mill products.

**Pig Iron.**—Backed by continued demand, prices have moved up 50c. a ton on both Northern and Southern iron. During the first part of last week business was taken by Southern furnaces at $14, Birmingham, for all deliveries up to the end of first quarter, with one seller of Northern iron booking orders at $18, furnace, or $18.50, Chicago, throughout the first half. By the middle of the week these prices were withdrawn and advanced to $14.50, Birmingham, and $19, Chicago, respectively. Outside of some scattering lots of prompt resale iron which might possibly be had for $14, the market is firmly established at $14.50 for fourth and first quarter deliveries. Last week's sales included a fair tonnage at the latter price, mostly for forward shipment. While transactions lack the spectacular interest afforded by heavy individual purchases, the movement is steady, and the numerous daily sales of small lots make a large weekly aggregate. With but few orders above 1000 tons, last week's transfers, which were almost wholly of foundry iron, amounted to not less than 30,000 tons. The demand for malleable Bessemer is increasing faster than for other foundry grades. Most of it is coming from the makers of railroad castings, such shops being generally full of work. Off grades are especially strong, the tendency being toward narrower spreads between them and No. 2. Practically all of the Southern furnaces are still declining to name prices for any delivery beyond first quarter. It should be noted that in the revised quotations given below, the outside spread is at present only nominal, as little iron is being moved at the top prices. The following quotations are for September delivery, f.o.b. Chicago:

| | |
|---|---|
| Lake Superior charcoal | $19.50 to $20.00 |
| Northern coke foundry, No. 1 | 19.50 to 20.00 |
| Northern coke foundry, No. 2 | 19.00 to 19.50 |
| Northern coke foundry, No. 3 | 18.50 to 19.00 |
| Northern Scotch, No. 1 | 19.00 to 19.50 |
| Southern coke, No. 1 | 19.35 to 19.85 |
| Southern coke, No. 2 | 18.85 to 19.35 |
| Southern coke, No. 3 | 18.35 to 18.85 |
| Southern coke, No. 4 | 17.85 to 18.35 |
| Southern coke, No. 1 soft | 19.35 to 19.85 |
| Southern coke, No. 2 soft | 18.85 to 19.35 |
| Southern gray forge | 17.35 to 17.85 |
| Southern mottled | 17.10 to 17.60 |
| Malleable Bessemer | 18.50 to 19.00 |
| Standard Bessemer | 19.40 to 19.90 |
| Jackson Co. and Kentucky silvery, 6% | 19.90 to 20.40 |
| Jackson Co. and Kentucky silvery, 8% | 20.90 to 21.40 |
| Jackson Co. and Kentucky silvery, 10% | 21.90 to 22.40 |

(*By Mail.*)

**Billets.**—The coming in of the Gary billet mill, which is now fairly under way, is expected to ease the pressure upon the leading interest for steel to supply its finishing departments. It is not likely, however, that even with this additional capacity any surplus will be available in the immediate future for the general market. Consumers of forging billets are finding difficulty in getting anything like prompt delivery from any source on new orders, and shipments of specifications against contracts are more or less delayed. An inquiry for 2000 tons of forging billets is reported, but it is understood that no quotations are being offered by local producers.

**Rails and Track Supplies.**—Liberal rail contracts for 1910 delivery have been placed by the leading Western railroads. The extent of purchases made is indicated by the fact that the Illinois Steel Company now has 350,000 tons of rails booked for shipment next year. This is likely to be shortly increased by the placing of additional important contracts, there being, according to reports, over 200,000 tons still under consideration. The August output of the Gary rail mill was 40,000 tons, and that of the South Works 50,000 tons. The demand for track fastenings is proportionately heavy. The Joliet spike and bolt mills continue to run at full capacity, the latter being especially crowded and unable to make deliveries inside of 60 days. There has been a considerable pick-up in light rail orders within the past week. Improvement in demand is attributed to the extended operation of lumber mills and mine improvements in preparation for the heavier service anticipated during the winter months. We quote as follows: 40 to 45 lb. sections, $26; 30 to 35 lb. sections, $26.75; 16, 20 and 25 lb. sections, $27; 2-lb. sections, $28, Chicago, less 50c. a ton on lots of 500 tons and $1 a ton on lots over 500 tons.

**Structural Material.**—A conspicuous feature of last week's transactions was the number of small fabricating orders included in the business placed. These are coming from widely distributed sources and cover a multiude of requirements, and are moreover significant of general industrial activity. Among the larger contracts were the Houston Belt Company's station building at Houston, Tex., 12,000 tons, which went to the American Bridge Company, and the new Northern Pacific depot, Tacoma, Wash., 800 tons, taken by the Minneapolis Steel & Machinery Company. All bids upon the steel grandstand for the South Side Baseball Park, Chicago, 1470 tons, have been rejected and new bids will be invited upon revised plans, in which

the tonnage will probably be considerably reduced. There is still pending 2500 tons required for the erection of an addition to the Commonwealth Edison Company's Quarry street power station, the general contract for which will probably be let in the near future. Preliminary estimates have been asked for the construction of a free bridge over the Mississippi River at Couteau avenue, St. Louis. This structure will involve the use of 12,000 tons or more of steel. Owing to the lengthening extension of deliveries of plain material from the mills, the execution of fabricating contracts is being seriously retarded. On this account one prominent interest is unable to operate its own shops at much over half its capacity. To facilitate deliveries and secure early shipment, some buyers of shapes for building structures are permitting the substitution of Bessemer for open hearth material originally specified. The estimating departments of the leading fabricating shops are working overtime on prospective jobs, the most of which are of little individual importance as to size. We quote plain material from mill at 1.68c., Chicago. Material from store is firmly held at 1.90c., Chicago.

**Plates.**—Continued demand for plates from car shops indicates that the local car building interests are preparing to increase their active capacity largely. Orders from other plate using industries are likewise increasing. The aggregate of incoming business still overreaches the rate of production, and in consquence no progress is being made by the mills in catching up on deliveries. With none of the mills able to accept new orders for shipment inside of six to eight weeks, and in some cases even longer, all prompt requirements are necessarily being drawn from warehouse stocks. These conditions have stiffened store prices, which are now firmly established on a basis of 1.85c., Chicago. On mill shipments we quote 1.68c., Chicago.

**Bars.**—The mills are receiving a very heavy volume of specifications against contracts, and although running at full capacity are unable to keep pace with demand. Most producers are at least 90 days behind on deliveries, with but little prospect of immediate betterment in the situation. From the inquiries lately received it would seem that consumers are about ready to consider the placing of contracts for next year. Up to the present time, however, the mills are holding back on such business, being not at all inclined to contract so far ahead at present prices. The demand for bar iron is steadily growing and the mills in this district, all of which not long ago were being only intermittently operated, are now going full. With the filling up of order books prices have stiffened. We quote steel bars at 1.58c. and iron bars at 1.50c. to 1.55c., all Chicago.

**Sheets.**—Evidence of the increasing demand for sheets is seen in the oversold condition of many of the mills, none of which is any longer in position to make prompt deliveries. Prices have firmed up to a point where concessions are practically out of the question. In fact, many mills that can ship with reasonable promptness are in position to command a premium over the regular market price. The mills are not, as a rule, quoting on business for delivery beyond January 1.

**Merchant Pipe.**—The volume of business being entered by the pipe mills in specifications and orders is quite sufficient to occupy their full capacity. As yet, however, shipments of merchant pipe are going forward with reasonable promptness, orders being usually executed in 30 days from the time they are received. Deliveries would doubtless be more retarded were it not that during the slack times the mills accumulated a considerable stock of merchant pipe, which is now being drawn upon. No change in prices has been announced, notwithstanding the general anticipation of an advance which, it was thought, would follow the upward trend of values of other mill products.

**Boiler Tubes.**—There has been a decided improvement in the demand for boiler tubes from the boiler shops, indicating that this industry, which has been slow to respond to trade expanding influences, seems at last to have been included in the general movement. While business from this source is not notably large, it at least shows distinctive betterment. The railroads are also buying locomotive tubes more freely and better trade in this line is looked for as the work of preparing motive power equipment for winter service gains headway.

**Cast Iron Pipe.**—The largest business reported for several weeks is included in contracts taken by the United States Cast Iron Pipe & Foundry Company, among them being 5000 tons for the city of West Seattle, Wash. The lettings were held September 4 and 11, when general contracts were awarded, orders for the pipe being subsequently placed by contractors. The specifications included pipe ranging from 6 in. to 30 in. Railroad orders for culvert pipe amounting to about 300 tons were secured by the same interest. As a result of higher cost of pig iron, pipe prices have advanced 50c. a ton. We quote per net ton, Chicago, as follows: Water pipe, 4 in., $28; 6 to 12 in., $27; 16 in. and up, $26, with $1 extra for gas pipe.

**Metals.**—Beyond a moderate demand for current consumption there is not much doing. Some inquiries for forward requirements in copper are coming out from the larger consumers, but no important deals of this character are reported. No change of consequence is observed in metal prices generally, and the market throughout is without developments of particular interest. We quote as follows: Casting copper, 13¼c.; lake, 13¾c. to 14c., in car lots, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 31½c.; small lots, 33c.; lead, desilverized, 4.45c. to 4.55c., for 50-ton lots; corroding, 4.70c. to 4.80c., for 50-ton lots; in car lots, 2½c. per 100 lb. higher; spelter, 5.75c. to 5.85c.; Cookson's antimony, 10⅜c., and other grades, 9¾c. to 10¼c.; sheet zinc is $7.50, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¼c.; copper bottoms, 11½c.; copper clips, 12¼c.; red brass, 11½c.; yellow brass, 9¼c.; light brass, 6¾c.; lead pipe, 4½c.; zinc, 4.50c.; pewter, No. 1, 23c.; tin foil, 25c.; block tin pipe, 27c.

**Old Material.**—Last week's market was not enlivened by brisk trading in any of the various grades of old material. Prices are being firmly maintained all along the line, but consumers seem to be buying only what is actually required for current use. This demand is nevertheless large enough to absorb easily the limited tonnage arriving on track for immediate disposal, and such material, instead of requiring concessions on part of the seller to insure prompt movement, is commanding prices equal, at least, to minimum quotations. Formal offerings in the way of railroad lists are scarce, none having thus far appeared for closure this week. A few of the roads are selling individual lots at private sale, but the aggregate included in such transactions is light. One important buyer of rolling mill scrap is temporarily holding up deliveries which have been coming in against contracts faster than they could be handled. Backed by increasing consumption of steel making interests, iron melters and rolling mills, the market seems at present to be firmly intrenched against weakening influences, and dealers are not pressing for business except at top figures. For the moment prices are practically stationary, but there is no abatement in the optimistic feeling entertained by sellers as to the realization of a higher level of values. The following prices are per gross ton, f.o.b. Chicago:

| | |
|---|---|
| Old iron rails | $19.00 to $19.50 |
| Old steel rails, rerolling | 17.25 to 17.75 |
| Old steel rails, less than 3 ft | 16.50 to 17.00 |
| Relaying rails, standard sections, subject to inspection | 22.50 to 23.50 |
| Old car wheels | 18.50 to 19.00 |
| Heavy melting steel scrap | 16.00 to 16.50 |
| Frogs, switches and guards, cut apart | 16.00 to 16.50 |
| Shoveling steel | 15.50 to 16.00 |

The following quotations are per net ton:

| | |
|---|---|
| Iron angles and splice bars | $18.00 to $18.50 |
| Iron car axles | 20.50 to 21.00 |
| Steel car axles | 18.50 to 19.00 |
| No. 1 railroad wrought | 15.50 to 16.00 |
| No. 2 railroad wrought | 14.50 to 15.00 |
| Springs, knuckles and couplers | 15.00 to 15.50 |
| Locomotive tires, smooth | 16.50 to 17.00 |
| No. 1 dealers' forge | 13.00 to 13.50 |
| Steel axle turnings | 11.50 to 12.00 |
| Machine shop turnings | 9.50 to 10.00 |
| Cast and mixed borings | 7.00 to 7.50 |
| No. 1 busheling | 12.75 to 13.25 |
| No. 2 busheling | 9.50 to 10.00 |
| No. 1 boilers, cut to sheets and rings | 11.50 to 12.00 |
| No. 1 cast scrap | 14.75 to 15.25 |
| Stove plate and light cast scrap | 12.50 to 13.00 |
| Railroad malleable | 15.75 to 16.25 |
| Agricultural malleable | 13.25 to 13.75 |
| Pipes and flues | 11.50 to 12.00 |

## Cincinnati.

CINCINNATI, OHIO, September 22, 1909.—(*By Telegraph.*)

Transactions in the local market continue satisfactory, the week's flight showing a growing independence on the part of iron makers, with a trifle less interest in the buying market, showing an inclination to retard the advance to abnormal levels. Of coke, however, this can scarcely be said, since the great volume of orders received by operators, coupled with the increasing labor troubles, as well as car shortage, tends to stiffen the prices and excite the oven districts. Machine tool concerns continue to increase payrolls and enlarge their scope of operations. Threatened car shortage interests officials of the Ohio Valley Improvement Association, who are watching the rising markets, and transportation members will enter the list as iron and coke carriers in active competition with the railroads. This will doubtless be the subject for discussion at the fifteenth annual convention of the association, which meets here October 14 and 15 at the Hotel Sinton.

**Pig Iron.**—The opening of the week witnesses a general advance on Southern irons of 50c. a ton and a further withdrawal from the market of Southern producers. Inquiries are not numerous, but as an indication that buying has not abated to any great extent, the record of 10,700 tons for Monday by a large merchant interest having offices in a number of cities is cited. The largest day's business of the

previous week was 14,000 tons, and these sales are exclusive of either day's sales of one of the company's largest Western offices. There is still some resale iron abroad, but as a rule it is held closely to the furnace price. Indications today are that such Southern furnaces as were willing to sell a limited tonnage of foundry iron last week at $14, and even as late as Monday, have advanced the price to $14.50 for delivery over the balance of the year. Northern irons are still quotable at $16, Ironton, for the remainder of the year, with an advance of 50c. for the first half. The close of September will witness an increase in the make of foundry iron in the Ironton District, and there is still considerable iron in some yards which is being shipped out rapidly. Arrangements are under way for reorganization with an increased capital of the Bird Iron Company, stockholders being offered stock equal to present holdings at par to the amount of $100,000. Jackson County silveries are unchanged, although producers are asking a premium of 50c. a ton for next year. Basic continues in good demand, several good sized lots having been contracted for last week for delivery to local mills and in this vicinity. Of this business, Virginia furnaces are said to have taken a good proportion. Charcoal irons are also strengthening, $18 at furnace being the quoted price for the Lake Superior product and $21, Birmingham, the minimum price on standard Southern. There is some scattering inquiry for low grade irons, and furnaces having small tonnages are asking and getting good premiums. Michigan automobile concerns have been heavy purchasers of foundry iron; one interest secured about 2000 tons, divided into Southern No. 3 foundry, Northern No. 2, Ohio silvery and some high manganese, and another is negotiating for about 10,000 tons for first quarter. A local foundry company asks for 1200 tons of foundry iron; an Indiana manufacturer of agricultural machinery wants 1200 to 1500 tons, and an Indiana motor works is figuring on 1000 to 1500 tons. For delivery over the balance of the year, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote f.o.b. Cincinnati as follows:

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|---|---|
| Southern coke, No. 1 foundry | $18.25 |
| Southern coke, No. 2 foundry | 17.75 |
| Southern coke, No. 3 foundry | 17.25 |
| Southern coke, No. 4 foundry | 16.75 |
| Southern coke, No. 1 soft | 18.25 |
| Southern coke, No. 2 soft | 17.75 |
| Southern coke, gray forge | 16.25 |
| Southern mottled | 16.00 |
| Ohio silvery, 8 per cent. silicon | 19.70 |
| Lake Superior coke, No. 1 | 17.70 |
| Lake Superior coke, No. 2 | 17.20 |
| Lake Superior coke, No. 3 | 16.70 |
| Standard Southern car wheel | $23.25 to 24.25 |
| Lake Superior car wheel | 20.25 to 21.25 |

*(By Mail.)*

**Coke.**—Recent visitors to the coke fields, particularly Connellsville, are impressed with the great activity in those regions and the increasingly independent attitude of operators. Some large contracts were placed for furnace coke last week. The labor shortage is menacing, and the car situation seems to be a similarly troublesome factor for the early future. Spot Connellsville furnace grades are quotable to-day at $2.25 to $2.50 per net ton at oven, but $2.65 and $2.75 are frequently heard for choice brands on hurry orders, and that is also the contract price. Foundry grades are quotable at about $2.50 to $2.75 for next year's shipments, and a few contracts are said to have been closed at around $3 for the first half. Wise County prices for spot furnace coke are $1.90 to $2, and on contract $2.25 to $2.50; Pocahontas brands, furnace, $2.25 to $2.50 on contract and $2 to $2.10 for spot.

**Structural Material.**—There is a good volume of building material moving, mostly to the South, and the price for plain material is strong, at $1.65, delivered. The Hocking Valley Railroad is ready to close on about 250 tons of steel for a series of small bridges. The Pennsylvania Railroad is figuring on some improvements in viaducts and other municipal railroad structures in two or three Central Western cities. As a rule, shapes are a little easier and deliveries better.

**Bars.**—Steel bars are quotable at 1.40c., Pittsburgh, minimum, and some mills are taking small orders at 1.45c. for early deliveries. The average promise is six to eight week on material that has to be rolled. The demand for iron bars has improved greatly and most local mills are busy. These mills are quoting about the same as Pittsburgh—viz., 1.45c. to 1.50c. at local mill. Steel tire, quotable at 1.75c., Pittsburgh, in large lots, is said to have been cut on some recently placed contracts in the Central West.

**Sheets.**—The largest interest reports activity in every item, and deliveries are from five to twelve weeks behind. Quotations are unchanged, notwithstanding the heavy bookings through the remainder of the year, being 2.20c. for black No. 28 and 3.25c. for No. 28 galvanized. Local mills are said to be securing a premium over these prices for immediate delivery.

**Old Material.**—The market has opened the week rather quietly, but all dealers are optimistic and are anticipating a heavy fall and winter business. One local dealer last week contracted to supply a consumer with material for his entire requirements during 1910. Railroad offerings last week were liberally taken by Cincinnati dealers. All dealers are in receipt of inquiries from and are negotiating with mills for 1910 requirements. The belief is expressed by the conservative element that present prices are the maximum for this year. These prices, representing the market for deliveries in buyers' yards, Cincinnati and southern Ohio, are as follows:

| | |
|---|---|
| No. 1 R. R. wrought, net ton | $14.50 to $15.00 |
| Cast borings, net ton | 8.00 to 8.50 |
| Heavy melting steel scrap, gross ton | 15.50 to 16.00 |
| Steel turnings, net ton | 9.00 to 9.50 |
| No. 1 cast scrap, net ton | 14.50 to 15.00 |
| Burnt scrap, net ton | 10.00 to 10.50 |
| Old iron axles, net ton | 19.00 to 19.50 |
| Old iron rails, gross ton | 18.50 to 19.00 |
| Old steel rails, short, gross ton | 15.50 to 16.00 |
| Old steel rails, long, gross ton | 16.50 to 17.00 |
| Relaying rails, 56 lb. and up, gross ton | 22.50 to 23.00 |
| Old car wheels, gross ton | 15.50 to 16.00 |
| Low phosphorus scrap, gross ton | 18.00 to 19.00 |

## Philadelphia.

PHILADELPHIA, PA., September 21, 1909.

The market continues strong in all departments of the iron and steel trade. Individual transactions are not so heavy, as most buyers have pretty well covered for their immediate wants; while willing to place business for future delivery, they find sellers either unwilling to open order books or else name prohibitive prices for extended deliveries. Foundry iron prices continue to advance, and transactions have usually been of a minor character. Steel billets are active, and the supply for this year's delivery is comparatively light; prices also show an upward movement. The individual tonnages being booked in plates and shapes are smaller, and some mills will not reach as high productive figures as they did last month. Considerable business, however, is on the books and a number of very satisfactory propositions are pending. The advance in the price of heavy steel melting scrap offered by the leading Eastern steel mills has brought out a very heavy tonnage of this grade of material, and $18 now represents the price the mills are willing to pay for deliveries during the balance of the year.

**Pig Iron.**—While the aggregate tonnage of business transacted recently has been quite large, the individual size of orders has diminished. In foundry grades there have been few contracts placed which run over 500 tons, and the largest proportion of the sales have been for delivery during the present year. Prices show considerable variation, due largely to the condition of sellers' order books. A number of the producers in the East are still out of the market, the greater part of their available tonnage for this year's delivery having been contracted for. Others who have a moderate supply still available steadily mark prices up, and apparently have little difficulty in getting the higher level, as desirable brands for this year's delivery are quite scarce. The minimum price for standard brands of eastern Pennsylvania No. 2 X foundry is now close to $18.25, delivered, while a large number of sellers ask and obtain freely an advance of 25c. a ton for prompt deliveries. Some sales have been made for delivery extending into the first quarter of next year, and prices for No. 2 X foundry, for such shipment, ranging close to $19, delivered; but few sellers, however, are willing to book any large orders at that figure. Low grade foundry iron is being actively inquired for, one Delaware River cast iron pipe maker being in the market for 10,000 tons for reasonably early delivery; but sellers have little iron of this grade to offer even at what might be considered a good price. Virginia foundry irons have been sold in moderate lots at prices close around $18.25, delivered, for No. 2 X. While this figure may still be done in some cases, the leading interest has now advanced quotations to $18.50 for prompt deliveries. The forge iron situation is rather complex. There has been some inquiry for moderate quantities, as well as at least one round lot, but makers have practically no iron of that grade to offer, and prices, while largely nominal, have been steadily advanced, $16.75 to $17, furnace, having been named in several instances, without, however, resulting in business. One small transaction involving a few hundred tons is reported at a price equal to $17.25, delivered in this district. Basic iron for delivery this year continues in fair demand, although the majority of steel plants have now taken care of their immediate requirements. An Eastern consumer as well as producer of basic purchased in the open market last week some 12,000 tons of that grade for delivery during the next 60 days, at close to $18, delivered, while a small lot, some 4000 tons, for prompt shipment was taken by another consumer at about the same price. Considerable inquiry is reported for basic for delivery the first half of next year, and while $18 can, no doubt, still be done, some makers ask an advance of 50c. a ton for such delivery. While there has been some inquiry for low phosphorus pig iron, no important sales are reported. A waiting position is taken by nearly all sellers of pig iron; there is no attempt being

made to force business, and further developments in the market are awaited. For moderate lots delivered in buyers' yards, eastern Pennsylvania and nearby points, during the remainder of the year, the following range of prices is named for standard brands; for delivery during the early portion of 1910 an advance of 50c. a ton being pretty generally asked:

| | |
|---|---|
| Eastern Pennsylvania, No. 2 X foundry | $18.25 to $18.50 |
| Eastern Pennsylvania, No. 2 plain | 17.75 to 18.25 |
| Virginia, No. 2 X foundry | 18.25 to 18.50 |
| Virginia, No. 2 plain | 18.00 to 18.25 |
| Gray forge | 17.25 to 17.50 |
| Basic | 18.00 |
| Low phosphorus | 21.00 to 21.50 |

**Ferromanganese.**—More inquiry is noted, and prices appear somewhat firmer. In the aggregate some 1500 tons have been asked for; the individual lots, however, have been small. One inquiry for a fair quantity for delivery during the second half of next year is reported, for which prices show a range of from $45 to $50, Baltimore. For delivery during the next six months a somewhat greater uniformity is shown, $43.50 to $44.50, Baltimore, being named.

**Billets.**—The demand continues active, and mills are rapidly filling up order books for this year's shipment. For delivery in the early part of next year makers still refuse to open their books. For prompt shipment prices show an upward tendency, $27 to $28, f.o.b. mill, being quoted for ordinary rolling steel; the minimum price for delivery here being $27.60, with deliveries extending up to the end of the year commanding a premium of about $1 a ton. Rolling steel is quite active, and prices are firm at $30, mill, for ordinary grades, the usual extras being added for special sizes and high carbons.

**Plates.**—While the tonnage is not quite as heavy in the aggregate as that booked some weeks ago, a very satisfactory volume of business is being taken by the mills. Order books have not yet been opened for 1910 deliveries, the business taken being for delivery during the remainder of this year. There is a greater uniformity of prices, and 1.65c., delivered, is being generally quoted for desirable orders, with small miscellaneous business commanding 1.70c., delivered.

**Structural Material.**—There is still an absence of business of a heavy character, although several good sized lots are expected to come out in the near future. Lots ranging up to 500 tons represent the general run of business which has been coming to the mills. Structural material mills are fully engaged, and most are well sold up for their output for the remainder of the year. Prices are firm, and 1.65c. to 1.70c., according to specifications, about represents the market for plain material delivered in this vicinity.

**Sheets.**—The demand continues very active, mills are fully engaged and prices for some grades show an upward tendency. The bulk of the business recently booked has been for prompt shipment, for which prices are firm but unchanged. Extended deliveries still command a premium of $1 to $2 a ton. The following range of prices is named for moderate lots for early delivery in this territory: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c.; No. 28, 2.80c.

**Bars.**—A sharper demand for both steel and refined iron bars is noted. Consumers show a desire to place orders for extended requirements, but makers still refuse to book orders for heavy quantities, particularly for iron bars, on deliveries extending into next year. Order books of many of the mills are in decidedly better shape and prices show a further slight advance, 1.55c. to 1.60c. representing about the average for refined iron bars for early delivery. Steel bars are strong at 1.55c., delivered.

**Coke.**—Prices continue to move upward, and in many instances it is impossible to get quotations from makers either for this year or early 1910 delivery. Capacity of ovens for early delivery, is, in some cases, reported as fully taken. Sales have usually been small individually, and mostly for delivery this year. Prices for foundry coke range from 2.40c. to 2.60c. per net ton at oven, with furnace coke at 2.10c. to 2.40c. at oven, with decidedly higher prices named, in some instances, for next year's shipment. For delivery in this territory this year, the following range of quotations is named:

| | |
|---|---|
| Connellsville furnace coke | $4.35 to $4.65 |
| Foundry coke | 4.65 to 4.85 |
| Mountain furnace coke | 3.95 to 4.25 |
| Foundry coke | 4.25 to 4.45 |

**Old Material.**—The expected advance in the price offered by the associated steel mills for heavy melting steel was made last week, $18, delivered, being named as the maximum figure the mills would pay for that grade of material. The advance brought out a very heavy quantity, variously estimated at from 75,000 to 100,000 tons, delivery over the balance of the year. Some 25,000 tons of the total was sold, it is said, by the local merchants. Unassociated mills have not advanced their prices, and it is understood that small lots have been taken by such mills at $17.50, delivered. Outside of the demand for heavy melting steel, the old material markets have been rather quiet. Prices, in a number of grades, show an advance, but the lots taken have been comparatively small. The following range of prices, while to some extent nominal, is named for prompt deliveries in buyers' yards, eastern Pennsylvania and nearby:

| | |
|---|---|
| No. 1 steel scrap and crops | $17.50 to $18.00 |
| Low phosphorus | 21.50 to 22.00 |
| Old steel axles | 23.00 to 23.50 |
| Old iron axles | 27.00 to 28.00 |
| Old iron rails | 20.50 to 21.00 |
| Old car wheels | 17.00 to 17.50 |
| Choice No. 1 R. R. wrought | 20.00 to 20.50 |
| Machinery cast | 16.00 to 16.50 |
| Railroad malleable | 16.50 to 17.50 |
| Wrought iron pipe | 17.50 to 18.00 |
| No. 1 forge fire scrap | 15.00 to 15.50 |
| No. 2 light iron | 10.00 to 10.50 |
| Wrought turnings | 14.50 to 15.00 |
| Stove plate | 13.50 to 14.50 |
| Cast borings | 12.50 to 13.00 |
| Grate bars | 14.25 to 14.75 |

## Pittsburgh.

PARK BUILDING, September 22, 1909.—(*By Telegraph.*)

**Pig Iron.**—Sales of pig iron have been heavy and there is some appearance of a runaway market. Prices have further advanced and several small sales of Bessemer for delivery in the first quarter of next year have been made at $18, Valley furnace. The Lackawanna Steel Company has bought 20,000 tons of Bessemer, Republic Iron & Steel Company 10,000 tons and Midvale Steel Company 3000 tons, all at $17.50, Valley furnace, and all for the last quarter. W. P. Snyder & Co. have sold Thomas D. West Foundry Company at Sharpsville, Pa., 15,000 tons of Bessemer for last quarter delivery, this iron being in addition to that regularly furnished by the Shenango Furnace Company, which ships molten metal to the West Foundry Company for making ingot molds. This last 15,000 tons was sold on a sliding scale basis, average monthly prices to apply on the contract. The Westinghouse interests, including the Air Brake, Machine and Electric companies, are in the market for Bessemer, basic, foundry and forge iron to the extent of about 12,000 tons for balance of the year. Other heavy inquiries are out for Bessemer and basic, and it is probable that by next week the price of Bessemer will be $18 at Valley furnace for balance of the year delivery. We quote standard Bessemer iron at $17.50, basic $16, malleable Bessemer $17, No. 2 foundry $16.50 and gray forge $15.50, all at Valley furnace, the freight rate to Pittsburgh being 90 cents a ton. A local consumer has bought 10,000 to 12,000 tons of Northern and Southern foundry for delivery over the rest of the year. We also note a sale of 3000 tons of standard Bessemer for delivery in the first quarter of next year at $18, Valley furnace; 1500 tons for the same delivery at the same price, and 1200 tons of basic for this year's delivery at $16, Valley furnace.

**Steel.**—The shortage in the supply of steel seems to be getting worse. All the mills are behind in deliveries and sold up on billets and sheet and tin bars for the balance of this year. Prices are very strong. We note a sale of 2000 tons of forging blooms to a local consumer at $29, Pittsburgh. We quote Bessemer billets, 4 x 4 in., at $25 to $25.50; open hearth billets, $26 to $26.50, and forging billets, about $29, all f.o.b. Pittsburgh, full freight added. Sheet and tin bars in random lengths are very firm at $26.50 to $27, Pittsburgh, full freight added. Standard, 4 x 4 in., Bessemer billets are $25, and random length sheet and tin bars $26, f.o.b. Youngstown, full freight added.

(*By Mail.*)

The week has been active, particularly in pig iron, and there are strong indications of a runaway market. When the fact is mentioned to the steel makers that the pace of the last three or four weeks has been too fast and is not healthy, the answer is made that late in 1908 and early in 1909 efforts to hold the market in check and keep it from declining were not successful, and that any attempt now to control the trade so as to keep prices on a reasonable level would be just as fruitless. In the past week, large blocks of Bessemer iron have sold at $17.50, Valley furnace, for delivery over the balance of the year, and there is every indication that the Bessemer market will be still higher. Practically all the leading steel companies that are producers of pig iron are short of metal; they have bought large blocks to cover this shortage and have inquiries out for more. In the last month the Youngstown Sheet & Tube, Republic, Jones & Laughlin, Lackawanna, Midvale and other leading steel companies have been heavy buyers of pig iron, and none of these interests has yet secured enough to guarantee it against a shortage in supply if the present consumption by their steel plants is maintained. The Carnegie Steel Company, in a short time, will be running 58 of its 59 blast furnaces, yet it is also getting short of metal. The scarcity in the supply of steel is just as great as, or even more than, it is in pig iron, and consumers who have not regular contracts for steel are now paying fancy prices to get anything like prompt deliveries. Forging billets have sold slightly above $29, and 4 x 4 in. open hearth billets for prompt shipment at $26.50 or higher. The new demand for finished material continues active, but there has not been quite the snap to business in finished products that was such a strong

feature of the market up to 10 days or two weeks ago. Prices on structural material, plates and steel bars are practically as high to-day as they were last February, prior to the declaration of the open market. When this was done, prices on bars, plates and shapes went down to a minimum of about 1.10c., but they are now back to their 1907-1908 level, and very firm. Prices on coke are going skyward, and heavy sales of standard furnace coke have been made for all of 1910 delivery as high as $2.90 per net ton at oven. Prices on scrap are moving upward, and small lots of heavy steel scrap have sold in the past week as high as $17.75 to $18, delivered in this district.

**Ferromanganese.**—No material change in price has been made, but the demand is active and a good deal of ferro is being sold for delivery in this market. We quote foreign 80 per cent. at $42.50 to $43, seaboard, for balance of the year delivery, the freight to Pittsburgh being $1.95 a ton. For delivery over the first half of 1910 as high as $45, seaboard, is being quoted, but we do not hear of this price having yet been paid.

**Ferrosilicon.**—There is a continued active demand and sales of 300 to 400 tons for delivery over the balance of this year in this district are reported. There is no change in prices for 1909 delivery, but for 1910 shipment from $2 to $3 advance is quoted. We quote $23 for 10 per cent. blast furnace ferrosilicon, $24 for 11 per cent., and $25 for 12 per cent., while 50 per cent. is now held at $64 to $64.50, f.o.b. Pittsburgh.

**Muck Bar.**—This product is scarce for prompt shipment, all makers of muck bar with one exception using practically their entire output in their own finishing mills. Prices are higher, due to recent advances on forge iron. We quote best grades of muck bar, made from all pig iron, at $29 to $29.50, Pittsburgh.

**Wire Rods.**—The market is very firm, and both Bessemer and open hearth rods for prompt shipment are scarce. Most consumers are covered by contracts placed some time ago, when prices were lower, and on which they are specifying freely. We quote Bessemer, open hearth and chain rods at $31.50 to $32, Pittsburgh.

**Skelp.**—Local mills are so well filled up that several consumers have recently bought good sized quantities of grooved and sheared plates for delivery in this district. Prices are very firm, and on iron plates are higher. We quote grooved steel skelp at 1.40c. to 1.45c.; sheared, 1.50c. to 1.55c.; grooved iron, 1.70c. to 1.75c., and sheared iron plates at 1.80c. to 1.85c., all for ordinary widths and gauges, f.o.b. Pittsburgh. We note a sale of wide sheared iron plates for delivery in the Pittsburgh District on the basis of 1.90c. at Eastern mill.

**Steel Rails.**—The Carnegie Steel Company has not yet booked any large contracts for standard sections for 1910 delivery, but a number of the important railroads have been at work on their estimates for next year, and some contracts are expected to be placed in the near future. In the past week the company received orders for about 6000 tons of standard sections, among which was 3000 tons for the Pittsburgh & Shawmut Railroad, and also booked new orders and received specifications against contracts for about 2600 tons of light rails. The same company has also recently received large orders for Schoen steel wheels from the Pennsylvania and Baltimore & Ohio roads. We quote steel axles at 1.65c. to 1.70c., and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 and 45 lb., $27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at $28, at mill.

**Plates.**—The McKees Rocks works of the Pressed Steel Car Company, which were closed for several months on account of the strike, are now in practically full operation, and this concern is now specifying with the Carnegie Steel Company for heavy quantities of plates, shapes and bars. Contracts are pending for the building of a number of ore and freight boats; these are expected to be placed soon and will mean heavy additional specifications for plates and shapes. The present output of plates by the leading makers is heavier now than at any time in two years. A great deal of business is pending and some active inquiries are in the market for steel cars. The Rock Island has placed orders for 500 furniture cars with the Standard Steel Car Company, and the Atchison, Topeka & Santa Fe has ordered 1000 refrigerator cars from the American Car & Foundry Company. The New York Central has inquiries out for 1000 box cars and the Seaboard Air Line for the same number. It is reported that the reorganized Chicago Great Western Railroad is preparing specifications for 2450 freight cars and 30 locomotives. All indications are that the plate mills will have all the work they can turn out through the winter months. We quote ¼ in. and heavier plates at 1.50c., Pittsburgh, in large lots, and 1.55c. in small lots.

**Structural Material.**—As indicating the tremendous amount of business in structural material placed since the open market was declared, and more particularly in the past three or four months, it is stated that the American Bridge Company has at present orders for about 385,000 tons on its books. It can fabricate about 60,000 tons a month, so that it is now assured of full work at all its shops for the next six months or more. The Michigan Central is in the market for about 4500 tons for subway and station work at Detroit, and the Wheeling & Bellaire Traction Company has asked bids on a steel bridge across the Ohio River between Wheeling and Bellaire, which will take about 5000 tons. Pittsburgh is also agitating the project of building a steel bridge over the Allegheny River from the Point to the North Side, which, if it goes through, will take 25,000 tons or more. A curious fact is that prices on plain material are said to be firmer in the Pittsburgh District just now than they are in New York or Chicago markets.

**Tin Plate.**—This week the American Sheet & Tin Plate Company is operating 153 out of 221 serviceable tin mills, and is steadily gaining in its output of tin plate. Consumers are urging the tin plate mills for prompt shipment against contract, and all the leading independents are running full, with enough business booked to carry them over the balance of this year. In some cases premiums of 10c. to 15c. a box are being paid for prompt shipments. We continue to quote tin plate at $3.40 per base box for 100 lb. cokes, f.o.b. Pittsburgh.

**Sheets.**—The American Sheet & Tin Plate Company is now operating 147 hot sheet mills out of 186 serviceable mills. It has started two of the four hot sheet mills in the Dresden Works, and in about two weeks will start up its Canton Works, which contain five hot sheet mills. The demand for sheets continues very heavy, particularly for roofing sheets. An inquiry is in the market for a heavy tonnage of roofing sheets to cover the new sheet mill buildings of the De Forest Company at Niles, on which most of the leading sheet mills are naming prices. Minimum prices on box annealed, one pass black sheets, are 2.20c. for No. 28 and 3.25c. for No. 28, galvanized. Roofing sheets are firm, at $1.55 per square for painted corrugated and $2.80 for galvanized corrugated, 2½-in. corrugations. Jobbers charge the usual advances over these prices for small lots from store.

**Bars.**—Specifications against contracts for steel bars continue to come into the mills at an unprecedented rate, and all the leading makers are now from six weeks to two months back in deliveries and the situation is getting worse. Republic, Carnegie, Jones & Laughlin and Cambria are so well filled up that they cannot take new orders for shipment inside of 60 days or longer. The bar iron mills are also well filled up, and prompt deiveries are hard to obtain. Specifications against contracts for iron bars are coming in freely, and the bar iron mills are now getting business from former users of steel bars, owing to their ability to make earlier shipments. We quote steel bars at 1.40c., minimum, while 1.45c. to 1.50c. is being paid for prompt delivery. We quote iron bars at 1.50c., minimum, at mill, Pittsburgh.

**Hoops and Bands.**—The new demand is quite heavy and specifications against contracts are coming in freely. We quote hoops at 1.50c. to 1.55c., and are advised that 1.60c. is being paid to mills that can make reasonably prompt deliveries. Steel bands are very firm, at 1.35c. to 1.40c., at mill, with steel bar card extras. The Carnegie Steel Company is now adhering rigidly on bands to the extras on its new card, printed in this issue last week.

**Shafting.**—While the new demand is quite active, the mills are runnjng mostly on specifications against the heavy contracts placed by consumers prior to September 1, when the advance in prices of about $3 a ton was made. We quote cold rolled shafting at 57 per cent. off in carloads and 52 per cent. in less than carloads, delivered in base territory, with proportionate advances for delivery in all other territories.

**Spikes.**—Some good sized orders for spikes for delivery over the balance of this year have recently been placed by Western roads, and heavy inquiries are in the market for a very large tonnage in spikes for delivery over all of 1910. Most makers of spikes are declining to bid on this business, preferring not to make engagements ahead at present prices, in the full belief that the market will be higher. Prices are very fim, and one maker is understood to be asking 10c. per keg advance over our quotations. We quote railroad spikes, 4½ x 9-16 in. and larger, at $1.70, and for smaller sizes and boat spikes at $1.75, base, subject to standard card extras, with an advance of 5c. per keg in less than carload lots.

**Rivets.**—At a meeting of the manufacturers of rivets held in New York City on September 14 an advance of $2 a ton was made, due to the heavy demand and higher prices ruling for raw materials. Rivet makers state that not for several years have they had as many orders on their books as at present, and some of them are behind in deliveries. We quote structural rivets, ¾ in. and larger, at 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ⅝ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than

1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

**Merchant Pipe.**—In the last week or two the new demand for merchant pipe has not been quite so active, probably due to the lateness of the season and the fact that several contemplated large projects will go over until next year. All the pipe mills have heavy engagements on their books and several are practically out of the market, not desiring to take on more business at the present level of prices, which they believe will be higher in the near future. A local mill has taken a large contract for line pipe, deliveries to commence at once. The Monongahela Natural Gas Company, which has been in the market for several weeks for 15 miles of line pipe, has not yet decided whether to lay a 12 or 16 in. line, but this matter will come up in the near future for decision by the directors, when the contract will be placed. Prices on both steel and iron pipe are very firm. The trade is still looking for the announcement by the leading interest at an early date of an advance in steel pipe, but nothing official on this has been given out. The official discount on black steel pipe, ¾ to 6 in., is 81 and 5, and on iron pipe, ¾ to 6 in., 75 and 5, in carload and larger lots to the wholesale trade. These prices are absolutely minimum, jobbers charging the usual advances to the smaller trade for shipment from store.

**Boiler Tubes.**—The new demand for locomotive tubes is more active than at any time in more than a year, some of the leading railroads having recently placed good sized orders for delivery over the balance of the year. The National Tube Company, in its seamless tube department, is very busy and is somewhat behind in orders. Prices on both locomotive and merchant tubes are firmer than for some time, but regular discounts are still being shaded to a slight extent.

**Iron and Steel Scrap.**—The whole scrap market is very firm, and prices are higher. It is difficult for dealers to do business at present for two reasons: consumers are not willing to take in large lots at present high prices and dealers will not sell very far ahead, believing the market will go still higher. The rapid advance in prices of pig iron, notably in foundry iron, has brought about a heavier demand for cast scrap and higher prices. The absolute minimum of the market on heavy steel scrap is $17.50; one prominent dealer is offering $17.75, and claims he has not been able to pick up any important tonnage at this price. We quote heavy steel scrap at $17.50 to $17.75 per gross ton for delivery at Monessen, Sharon, Steubenville, Pittsburgh, Brackenridge and Follansbee, these being the leading steel scrap consuming districts in the Pittsburgh territory. Prices on borings are very firm at $11 to $11.25; No. 1 cast is $16.25 to $16.50; No. 2, $15.25 to $15.50; low phosphorus melting stock, 0.04 and under, $21.50 to $22; sheet bar crop ends, $19.50; steel axles, $21.75 to $22; iron axles, $27 to $27.50; grate bars, $13.50 to $14; rerolling rails, $18 to $18.50, delivered, Newark or Cambridge, Ohio; locomotive tires, $20; locomotive axles, steel or iron, $29; old car wheels, $18 to $18.50; machine shop turnings, $13 to $13.25; standard iron axles, $27.50; stove plate, $13; No. 1 railroad wrought scrap, $18 to $18.50; No. 1 busheling, $16 to $16.25; No. 2, $12.50 to $13, all per gross ton, f.o.b. Pittsburgh, unless otherwise stated. We note sales of 500 tons of heavy steel scrap at $17.50; 2000 tons at $17.75; 4000 tons of borings at $11.25; 500 to 600 tons of turnings at $13; 1000 tons of borings at $11, all per gross ton, delivered in Pittsburgh District.

**Coke.**—On October 1 the option given some months ago by upward of 60 coke operators to the syndicate which proposed to consolidate these plants into one company will expire, and it is believed that nothing will come of it. It is possible that three or four fairly large coke concerns may consolidate before the end of the year, but not on the lines proposed by the syndicate, which was unable to put the deal through. The demand for coke is very active, and standard makes of furnace coke for prompt shipment are held at $2.40 to $2.50 per net ton at oven for the balance of this year, while for the first half of next year $2.75 to $2.90 per net ton at oven is quoted for best grades of furnace coke. Standard 72-hr. foundry coke for this year's delivery ranges from $2.50 to $2.75, and for next year's delivery there is a wide range in prices, the lowest being about $3 and the highest about $3.25 per net ton at oven. No business has yet been done at the latter figure. The output of coke at present is heavier than at any time in two years; last week the Upper and Lower Connellsville regions turned out 424,568 net tons, a slight increase over the previous week.

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With the remarkable progress made within the past year or two in cheapening the cost of autogenous welding, manufacturers of electric power and lighting transformers are beginning to put on the market apparatus having welded cases, which are regarded by customers as a substantial improvement over the earlier form of construction.

## St. Louis.

ST. LOUIS, September 20, 1909.

As the circulation of money is a reliable barometer of business conditions, the fact that the cash in the St. Louis banks is being put to work in normal enterprises is of important significance. A recent summary of the statements of 40 local banks, issued by the Clearing House Association, shows that these banks have increased their loans by over $5,000,000 since June 23. The national banks have increased their circulation by $364,655, making a total of $17,768,287 now in circulation. The banking capital has been increased by $2,720,800.

**Coke.**—As foreshadowed in the late reports of the producing districts, a further advance is asked for coke, supported by a steadily improving demand, which, in turn, is occasioned by the large business being done in iron and steel. No doubt apprehension of delay in transportation to be occasioned by car shortage in the late fall is beginning to engage the attention of consumers and is leading them to increase their stocks. Some of the principal sales agencies have received instructions to make an advance of 25c. per ton on Connellsville standard foundry coke for prompt shipment. We quote standard 72-hr. foundry coke at $2.50 for prompt shipment; $2.65 for shipment over the balance of the year and $2.75 for shipment over next year, f.o.b. oven, Connellsville.

**Pig Iron.**—The demand for pig iron continues active and is coming from the entire range of St. Louis territory. Increasing difficulty is being experienced in placing orders for shipment over the last quarter of 1909, owing to the indisposition of furnacemen to take on more business at current figures, and also due, to a considerable extent, to the fact that their commitments for prompt and early shipment are already quite heavy. A leading brokerage house reports a sale of 5600 tons car wheel iron to a foundry in local territory, shipment to be made at the rate of 1400 tons per month for the next four months. Requirements for confirmation of sales of any considerable size are now general, and will doubtless continue while the market remains in sellers' favor. We quote prices, with the proviso referred to above, as follows: For shipment over the balance of 1909, $14; for shipment over the first quarter of 1910, the same price is offered and some sales have been made on that basis. These figures refer to Southern No. 2 foundry, f.o.b. Birmingham.

**Old Material.**—The leading dealers report good business, with a broadening of the market owing to increased inquiry from consumers. No railroad lists are offering, but it is probable that some companies are selling scrap iron on private terms. With the exception of old car wheels, the price-list remains unchanged, but firm. An advance in pig iron will undoubtedly be followed, under present conditions, by an advance in scrap iron and steel. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

| | |
|---|---|
| Old iron rails | $16.00 to $16.50 |
| Old steel rails, rerolling | 16.00 to 16.50 |
| Old steel rails, less than 3 ft. | 15.75 to 16.25 |
| Relaying Rails, standard sections, subject to inspection | 24.50 to 25.00 |
| Old car wheels | 18.00 to 18.50 |
| Heavy melting steel scrap | 16.00 to 16.50 |
| Frogs, switches and guards, cut apart | 16.00 to 16.50 |

The following quotations are per net ton:

| | |
|---|---|
| Iron fish plates | $13.75 to $14.25 |
| Iron car axles | 20.50 to 21.00 |
| No. 1 railroad wrought | 15.25 to 15.75 |
| No. 2 railroad wrought | 14.25 to 14.75 |
| Railway springs | 13.75 to 14.25 |
| Locomotive tires, smooth | 14.50 to 15.00 |
| No. 1 dealers' forge | 11.00 to 11.50 |
| Mixed borings | 7.50 to 8.00 |
| No. 1 boilers, cut to sheets and rings | 11.00 to 11.50 |
| No. 1 cast scrap | 13.50 to 14.00 |
| Stove plate and light cast scrap | 10.75 to 11.25 |
| Railroad malleable | 13.00 to 13.50 |
| Agricultural malleable | 12.00 to 12.50 |
| Pipes and flues | 11.00 to 11.50 |
| Railroad sheet scrap | 10.50 to 11.00 |
| Railroad grate bars | 10.75 to 11.25 |
| Machine shop turnings | 9.50 to 10.00 |

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The Jefferson Iron Company, Jefferson, Texas, expects to start making high grade foundry pig iron on or about October 15. The De Camp Bros. & Yule Iron, Coal & Coke Company, St. Louis, is sales agent.

The traffic managers of the Missouri Pacific Railroad report a heavy movement of freight, instancing that in the latter part of August 12,000 cars of regular freight were handled in one day.

The Missouri, Kansas & Texas Railway, according to an announcement by A. H. Joline, president, will provide freight terminals to cost upward of $4,000,000, in St. Louis. A company has recently been formed, known as the Missouri, Kansas & Texas Terminal Company, which has acquired large tracts of land in North St. Louis and will construct without delay the tracks and buildings necessary.

At a recent meeting of the St. Louis Terminal Board, the directors decided to purchase 10 switching locomotives, and the president will at once solicit bids and specifications.

The directors of the Wiggins Ferry Company at a re-

cent meeting decided to have specifications prepared looking to action by the board in the purchase of two steel ferry-boats.

## Buffalo.

BUFFALO, N. Y., September 21, 1909.

**Pig Iron.**—The demand has been good, with purchases reaching a heavy tonnage. The foundries in this district are becoming busier and are placing a much larger volume of business with the furnaces than for some time. This is especially true of foundries making castings for railroads, and they report a very great improvement in trade. There is an active demand for basic, and some good sales are reported, although the supply available from this district is not large. The Buffalo Union Furnace Company has arranged with the Lackawanna Steel Company to furnish the latter 25,000 tons of Bessemer iron on a conversion deal, the Lackawanna Company supplying the ore. The Bessemer needs of the latter company are in excess of its furnace capacity. The temporary withdrawal of the furnace which will run on this contract as an active producer to the foundry trade will undoubtedly have an important effect upon this market for the time being. One local furnace interest is sold to capacity and is practically out of the market for the next six months, and has been compelled to refuse business for gray forge at $16, No. 2 X at $17 and No. 1 X at $18 for this year's deliveries. The other Buffalo furnaces, although firm in their views as to advancing values, are adhering to a lower schedule of prices. We quote as follows for balance of year and first quarter deliveries, f.o.b. Buffalo:

| | |
|---|---|
| No. 1 X foundry | $16.50 to $17.00 |
| No. 2 X foundry | 16.25 to 16.75 |
| No. 2 plain | 16.00 to 16.50 |
| No. 3 foundry | 15.75 to 16.00 |
| Gray forge | 15.75 to 16.00 |
| Malleable Bessemer | 16.25 to 16.75 |
| Basic | 17.00 to 17.50 |
| Charcoal | 19.50 to 20.00 |

**Finished Iron and Steel.**—Business in general lines is keeping up in a very satisfactory manner, with increasing activity in bars and plates. The demand for bars and large rounds is far ahead of the capacity of the mills, and jobbers are benefiting accordingly. Prices are very firm and in some cases pressure for material enables the mills to obtain more than the current schedule prices. Railroad shops are filling up with work and taking large quantities of material. The demand for structural material also continues heavy. The local office of the leading interest reports having received another 5000 ton order for structural material for export to Canada this week, additional to the 5000 ton export order mentioned last week. The general contract has been let for the seven-story hotel to be built by the Akron Hotel Company, Akron, Ohio, from plans by Buffalo architects and specifications for the steel required, about 800 tons, will soon be in readiness for bids. Bids were received the latter part of last week for steel for addition to the Hammermill Paper Company's plant at Erie, Pa., 400 tons, but the contract has not yet been given out. Bids will be received this week for steel for the laboratory and office building to be erected by the American Radiator Company at its Pierce plant, Buffalo, about 100 tons.

**Old Material.**—The market continues strong and active, with a fair demand in all lines, and a good aggregate tonnage is being moved. Sales have been largely to outside districts, principally to Eastern and Pennsylvania points. Prices are very firm, but with no quotable change from last week's schedule. Dealers' prices are as follows per gross ton, f.o.b. Buffalo:

| | |
|---|---|
| Heavy melting steel | $16.50 to $17.00 |
| Low phosphorus steel | 21.00 to 21.50 |
| No. 1 railroad wrought | 17.00 to 17.50 |
| No. 1 railroad and machinery cast scrap | 15.50 to 16.00 |
| Old steel axles | 20.00 to 21.00 |
| Old iron axles | 23.50 to 24.00 |
| Old car wheels | 17.00 to 17.50 |
| Railroad malleable | 16.00 to 16.50 |
| Boiler plate | 14.50 to 15.00 |
| Locomotive grate bars | 12.50 to 13.00 |
| Pipe | 13.00 to 13.50 |
| Wrought iron and soft steel turnings | 10.75 to 11.25 |
| Clean cast iron borings | 9.00 to 9.50 |
| No. 1 busheling scrap | 14.00 to 14.50 |

The S. Severance Mfg. Company, Glassport, Pa., manufacturer of spikes and rivets, has recently appointed C. H. Lewis, 1604 Hazel drive, Cleveland, Ohio, as its representative in that district. The company is operating its works on full time on orders for railroad and boat spikes, &c.

The Fort Smith Iron & Metal Company, Fort Smith, Ark., has recently engaged in business, buying and selling all kinds of scrap iron and steel and metals. B. S. Barnard is manager.

## Cleveland.

CLEVELAND, OHIO, September 21, 1909.

**Iron Ore.**—Furnacemen are showing considerable anxiety regarding ore prices for next year, and the ore men are in receipt of frequent inquiries as to what the prices will be. While it is not likely that the question of next season's prices will be formally considered by the merchant ore firms within the next two or three months, the opinion is freely expressed by ore men that prices will be advanced 50c. a ton, restoring the prices that prevailed during 1907. The 50c. reduction was made in 1908, and no changes in prices were made for the present season. The buying movement for this year is nearly over, although some small lot sales are still being made. The ore movement continues very heavy and it is expected that the September shipments will reach 7,000,000 tons. A large portion of the ore now being shipped is being piled on the docks. Prices at Lake Erie docks, per gross ton, are as follows: Old Range Bessemer, $4.50; Mesaba Bessemer, $4.25; Old Range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

**Pig Iron.**—The market is very firm and fairly active, and orders are being placed at higher prices than prevailed a week ago. We note the sale of 5000 tons of Bessemer iron by the Bessemer Pig Iron Association at $17.50, Valley furnace, for the last quarter delivery, and a local interest reports that it has under consideration an offer of $18 for 5000 tons of Bessemer for the same delivery. Local furnaces are figuring on new inquiries for about 15,000 tons of iron, mostly for the first half delivery. One inquiry is for 3000 tons of basic, the remainder being for foundry. The largest inquiry is from the local plant of the Westinghouse Electric & Mfg. Company for 3000 tons of Nos. 1, 2 and 3 for the last quarter, and perhaps extending into next year. The Westinghouse interests also have inquiries out for round tonnages of foundry and malleable iron for their other plants. We note the sales of two 1000 ton lots of No. 2 foundry at $17, Valley furnace, for the first half, and one 500-ton lot by a local furnace at $17, at furnace, for the same delivery, all for shipment to northern Ohio points. This is the minimum local price for any delivery. In the Valley No. 2 foundry is quoted at $17 to $17.25, for the first quarter and half, and the former now seems to be the minimum price. For last quarter delivery No. 2 foundry is quoted at $16.50 to $17, Valley furnace. A local interest reports the sale of considerable iron during the week for shipment from Pennsylvania furnace to Pittsburgh and vicinity at $16 to $16.50 for No. 2 for the last quarter, but is now holding to the latter price. Two important interests that have been temporarily out of the market are again taking on contracts. The new blast furnace of the Cleveland Furnace Company was blown in September 17 on basic iron. Furnace B of the Toledo Furnace Company, which has been out for relining, was blown in September 16. For the balance of the year we quote, delivered Cleveland, as follows:

| | |
|---|---|
| Bessemer | $18.40 |
| Northern foundry, No. 1 | $17.50 to 18.00 |
| Northern foundry, No. 2 | 17.25 to 17.50 |
| Northern foundry, No. 3 | 16.75 to 17.00 |
| Southern foundry, No. 2 | 18.35 |
| Gray forge | 15.75 to 16.00 |
| Jackson County silvery, 8 per cent. silicon | 20.05 |

**Coke.**—The market is very firm. Little spot coke is reported available, and producers still complain of a scarcity of labor in the Connellsville region. Standard Connellsville coke is held at $2.50 per net ton, at oven, for spot shipment and for the balance of the year, and at $2.50 to $2.75 for the first half. Some contracts for foundry coke for the first half are being placed. For that delivery we quote standard 72-hour foundry coke at $2.65 to $3. In response to an inquiry for prices for prompt shipment, a consumer received six quotations, all different, the prices quoted ranging from $2.40 to $2.95.

**Finished Iron and Steel.**—All the mills report very heavy specifications on steel bars, plates and structural material. The increase of orders is doubtless largely due to the rush by consumers to get in specifications on low priced contracts that expire October 1. The consumption, however, appears to be on the increase; some consumers have already specified to the full amount of their contracts, particularly in steel bars, and are in the market for additional quantities. A good volume of new business in steel bars is coming out, but some of the mills are so far behind with deliveries that they are refusing to take on any more contracts at present. Inquiries are quite plentiful for steel bars, plates and structural material for delivery after the first of the year, but the majority of the mills are refusing to make such contracts. One interest is taking on some bar orders for the first quarter at 1.40c., Pittsburgh, and another mill that has closed some contracts for plates and shapes at 1.50c., for the first quarter, has advanced its price for that delivery to 1.60c. The demand for structural material in small lots continues good. The largest new work that has come out is a contract for ore handling machinery for the Lake Shore Railroad at Ashtabula, for which there is an inquiry out for

1700 tons of plates and shapes. While the larger plate mills are crowded with orders, some of the smaller mills can make quick deliveries and are getting a premium of $2 a ton for prompt shipment. The demand for iron bars continues heavy and local mills are well filled with orders. Local bar iron mills have advanced their price $1 a ton to 1.55c., Pittsburgh. We quote iron bars at 1.55c. to 1.65c., Cleveland. The demand for sheets continues good and prices are being firmly maintained. Steel rivet manufacturers have made another advance of $2 a ton to 1.90c., base, Pittsburgh, for structural rivets, and 2c. base for boiler rivets. The demand for shafting is good and prices are firm. The demand for light rails in car lots from coal mining companies is quite active. Jobbers report a very heavy volume of orders for all lines from stock.

**Old Material.**—The demand for all grades of scrap is quite heavy. Prices are very firm, and an advance of 50c. a ton is noted in a number of grades. Local steel and bar iron mills have bought considerable tonnage during the week, and local dealers report the sale of good sized lots to Valley mills and in the Pittsburgh District. The advance in price has brought out considerable scrap from yard stocks, although most of the dealers are not disposed to sell large lots, believing that prices will go higher. The Lake Shore Railroad will close September 23 on a list of about 1200 tons. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

| | |
|---|---|
| Old steel rails | $16.50 to $17.00 |
| Old iron rails | 19.00 to 19.50 |
| Steel car axles | 19.50 to 20.00 |
| Old car wheels | 16.50 to 17.00 |
| Heavy melting steel | 15.75 to 16.25 |
| Relaying rails, 50 lb. and over | 21.50 to 22.50 |
| Agricultural malleable | 14.50 to 15.00 |
| Railroad malleable | 16.00 to 16.50 |
| Light bundled sheet scrap | 9.50 to 10.00 |

The following prices are per net ton, f.o.b. Cleveland:

| | |
|---|---|
| Iron car axles | $20.50 to $21.00 |
| Cast borings | 8.00 to 8.50 |
| Iron and steel turnings and drillings | 10.00 to 10.50 |
| Steel axle turnings | 12.00 to 12.50 |
| No. 1 busheling | 14.00 to 14.50 |
| No. 1 railroad wrought | 15.00 to 15.50 |
| No. 1 cast | 14.00 to 14.50 |
| Stove plate | 12.00 to 12.50 |
| Bundled tin scrap | 10.50 to 11.00 |

## Birmingham.

BIRMINGHAM, ALA., September 20, 1909.

**Pig Iron.**—The records of the past week and the attitude now being manifested by the selling interests are indicative of an advance of 50c. per ton over the $14, Birmingham, basis. It is probable that the buying movement has been checked to some extent by the latest advance, but the demand has not been supplied and the appearance of furnace yards is not yet proof that melters' requirements have been anticipated in adjusting the rate of production. A notable feature of the market is the fact that the largest producer, and one that has been practically out of the market for many months, still refuses to quote for any delivery and is operating all available capacity for the delivery of actual specifications. The second largest producing interest quotes $14.50 for the last quarter, and other smaller interests who have adopted that basis would ask a differential of 50c. per ton over that price for first quarter deliveries. In all cases quotations on 1910 deliveries are made with reluctance, and it is not believed that prices applicable to first half shipments have yet been elicited. There has been considerable tonnage booked for the first quarter, and before such deliveries are being made it is quite probable that the output will have been materially increased, but the theory that the furnace interests have the situation well in hand is not demonstrated. In some cases it is probable that small lots of high grades for spot shipment can be had on the $14 basis, but it is certain that forward deliveries in any quantities could not be had at such figures. The recent demand for gray forge and No. 4 foundry is unprecedented. Small lots of the former have sold during the week at No. 3 foundry prices, and for a lot of 2000 tons, to be delivered during the last quarter, $12.75, Birmingham, was refused before the last advance. An aggregate of some 1500 to 2000 tons of charcoal iron is among the sales reported. This iron is quoted at from $21 to $21.50 per ton, f.o.b. furnace.

**Cast Iron Pipe.**—The most attractive proposition just at this time is the requirement for the city of Atlanta, Ga., which it is understood will be placed as soon as a bond issue is decided upon. It is estimated that this requirement will consist of some 20,000 tons of water pipe. The city of Macon, Ga., it is understood, will soon enter the market for an attractive tonnage, and the placing of bonds by that city will be awaited with interest. Following the general improvement in all lines of foundry trades, it is expected that the fall and winter months will be unusually active ones in this particular line by reason of the conservative course heretofore adhered to by the consumers. Quotations as published are now believed to be especially attractive, as the increase in cost of raw material will of necessity result in an advance at a not far distant date. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 to 6 in., $26; 8 to 12 in., $25; over 12 in., average, $24, with $1 per ton extra for gas pipe.

**Old Material.**—A fairly satisfactory tonnage has been involved by transactions during the week, and dealers appear to be contented with conditions exising. Asking prices are generally higher, but the inabilty of dealers to furnish light cast in such quantities as demanded has resulted in sales of low grade pig ron instead. We revise dealers' asking prices as follows, per gross ton, f.o.b. cars here:

| | |
|---|---|
| Old iron rails | $17.00 to $17.50 |
| Old iron axles | 18.50 to 19.00 |
| Old steel axles | 16.50 to 17.00 |
| No. 1 railroad wrought | 13.50 to 14.00 |
| No. 2 railroad wrought | 11.50 to 12.00 |
| No. 1 country wrought | 10.50 to 11.00 |
| No. 2 country wrought | 10.00 to 10.50 |
| No. 1 machinery | 11.50 to 12.00 |
| No. 1 steel | 11.00 to 11.50 |
| Tram car wheels | 11.00 to 11.50 |
| Standard car wheels | 12.50 to 13.00 |
| Light cast and stove plate | 10.50 to 11.00 |
| Cast borings | 5.50 to 6.00 |

## The German Iron Market.

### A More Active Demand and Firmer Prices.

BERLIN, September 9, 1909.

The German iron market at last begins to feel the effect of the upward movement in America. From many directions come reports now of a more active demand and firmer prices. In the crude iron market the American improvement is making itself directly felt in the form of pretty large contracts for spiegeleisen, which already amount to a total of above 50,000 tons, and it is expected that much more iron of this grade will be taken for America, as there are still pretty large inquiries in the market. These American purchases, however, are at very low prices, leaving but a small profit, if any, to the producers. The latter tried therefore to induce the ore producers to give them a drawback on the iron exported to America, but their appeal was rejected. However, the Coal Syndicate gives a drawback of 3.50 marks per ton on coke used in smelting export iron.

Iron prices have begun to pick up a little. On the two last trading days on the Dusseldorf Exchange—August 20 and September 3—there were advances of about 1 mark a ton on some qualities of pig, and slight advances in bars and heavy plates were also registered. The Rhenish manufacturers of band iron voted several days ago an advance of 2.50 marks in the price of that specialty, offering as an explanation of their action that the present prices scarcely cover the costs of production. At the same time a statement was given out by them saying that they were amply supplied with work, their contracts being sufficient to keep them employed for the rest of the year. About the end of August the manufacturers of bars in the Lorraine-Luxemburg-Saar District agreed to sell no more bars at less than 95 marks, which meant an advance of 2 or 3 marks the ton, and to take no contracts at present prices for next year's delivery. The Rhenish-Westphalian mills also agreed to reject offers made before the end of September for 1910 delivery, but they were unable to reach a decision to lift prices. From the Silesian District comes the news that dealers there have marked up the prices of bars by 2.50 to 5 marks per ton.

### Present Prices Unprofitable.

The general expectation is that better prices can be put into effect before the end of the year, and most manufacturers are convinced of the necessity of this, since present prices leave in many cases hardly any profit, and some concerns complain that they are working at a loss. For this reason the slight upward movement of prices has not had any marked effect in raising the hopes of manufacturers. Recent interviews in the newspapers with leading iron manufacturers indicate that they are taking a very cool and rather skeptical view of the situation and the future prospects of the market. While they admit that a certain improvement has been observed, they decline to make it the basis for any great confidence respecting further developments. On the contrary, they warn the boomers of the stock exchanges that they are carrying things with much too high a hand, that present prices for iron shares are far too high, and that a backset must surely follow.

Thus far, however, these warnings have been wholly without effect. The outsiders have taken it into their heads that a great revival of trade in all industries is about to set in, particularly in the iron industry. The oft-reiterated argument for this view is the rapid recovery of the American iron market, which they say is only a forerunner of what will soon be seen in Germany. The confidence of the public is so great that iron shares continue to mount strongly. It must be remarked, however, that the bull speculation in iron shares here is now almost wholly in the hands of the public. Professional stock operators are mostly tak-

ing the bear side of the account in iron and coal shares, and as the outsiders have taken the reins into their own hands, it is to be feared that their wild driving will soon end in a smash-up.

## New York.

NEW YORK, September 22, 1909.

**Pig Iron.**—A considerable number of foundries have been in the market in the past week and their purchases for the last quarter and in some cases for the first quarter of next year foot up to a round figure. One sale of 7000 tons of foundry iron is reported, and a number of contracts for several thousand tons each. Buffalo furnaces closed a considerable New England business. Foundry buying is persistent and there is an increasing disposition to contract for next year, though furnace companies are not anxious to sell beyond this year. Eastern Pennsylvania furnaces are quoting $17.75 to $18.25 at furnace for No. 2 foundry for this year, and for next year prices are 25 to 50c. higher. We quote New York prices as follows: Northern No. 1 foundry, $19 to $19.50; No. 2 foundry, $18.50 to $19; No. 2 plain, $18 to $18.50, for delivery in 1909. Alabama iron for this year's delivery is sold at $18.50.

**Steel Rails.**—The Grand Trunk is in the market for 7500 tons for delivery early in 1910. Eastern roads are making up estimates of their requirements for next year, but Pennsylvania mills have closed little business as yet.

**Structural Material.**—Two New York buildings have been let without general bidding in the past week, going to the Hay Foundry & Iron Works. About 9000 tons of steel is required. One is the Philip Braender Building at Twenty-fourth street and Fourth avenue. The other is the Henry Korn Building on Fifth avenue. The Eastern Steel Company has taken similarly, without competition, a garage on Fifty-fourth street, calling for 2000 tons. The Riter Conley Mfg. Company has taken two Central Western contracts—one, the Upson Nut Company Steel Plant building at Cleveland, Ohio, 950 tons, and the other a new tin plate building at McKeesport, Pa., 1200 tons. The Baltimore & Ohio has called for bids on about 2000 tons of steel for bridges. The Lehigh Valley's recent bridge work, about 600 tons, was awarded to the Pennsylvania Steel Company, the King Bridge Company and Lewis F. Shoemaker. The Pennsylvania Steel Company has taken the first of the Cape Cod Canal rolling lift bridges, amounting to about 1000 tons. We continue to quote plain material, tidewater delivery, on the basis of 1.66c. for beams and channels up to 15 in.

**Ferroalloys.**—We hear of sales of ferromanganese under $43, but that does not make the market. It is apparent that some one is offering it at resale and the transactions reported were in small lots picked up here and there. We know of a sale of 150 tons at $43.75, and since that time an offer from a buyer at that price was refused. We quote the market at $44. Ferrosilicon is not in strong demand and sellers are asking from $62 to $63, New York. There are also reports of resales of ferrosilicon at low prices.

**Wrought Iron Pipe.**—Eastern manufacturers report an exceedingly strong market. The demand is so heavy that all of them are falling further and further back in making deliveries.

**Bars.**—Bar iron is in considerably better demand. Leading consumers, such as locomotive and car builders, as well as railroad repair shops, are specifying more liberally. Eastern manufacturers now quote 1.60c. to 1.62½c., tidewater, on ordinary bar iron, and 1.70c., tidewater, on refined and test bars, and are not disposed to contract far ahead even at these prices. Steel bars are held at 1.56c. to 1.61c., tidewater.

**Cast Iron Pipe.**—Considerable work is coming out on New York City account. Within the past week two contracts were let. One of these, requiring 1740 tons, was secured by M. J. Drummond & Co., while the other, calling for 1300 tons, was awarded to contractors who have not yet purchased the pipe. The city will shortly let a contract for an extension of the Brooklyn water service, which will call for 8200 tons, of which, however, the principal part may be steel riveted pipe, as bids are to be asked for on both steel and cast iron pipe. Within a month or so another contract will be awarded, which is expected to be almost as large. The Glamorgan Pipe & Foundry Company, Lynchburg, Va., secured a contract from Richmond, Va., for 1700 tons. Quite a number of small lots covering the requirements of municipalities for the remainder of the season were awarded during the week. The demand for small quantities is better than at any previous time this year, and buyers are now finding that it is quite difficult to get deliveries on what they would like to secure for their necessities this fall. The foundries have been filling up steadily and are no longer in position to make prompt shipment, especially on small sizes. It is worthy of note that a good aggregate of business is being received in small orders coming from suburban land companies now making improvements in this vicinity. Quotations on carload lots of 6-in. per net ton at tidewater are $24.50 to $25.50.

**Old Material.**—The market is strong. Heavy melting steel scrap continues to occupy the center of the stage. An offer of $18, delivered in eastern Pennsylvania, is stated to have been made for 10,000 tons, but the holder asked a higher price. While some large stocks of steel scrap are known to be in the hands of dealers, they are held for higher prices, and as the available supply coming from railroads and other sources is not large, the market presents an appearance of scarcity. The impression prevails, however, that prices are steadily approaching a level which will prove attractive to at least some of these holders. Another commodity quite scarce is cast borings, of which the local supply is exceedingly light, and it is not being supplemented as usual by accumulations in New England, as the local consumption there is now taking the current output. Wrought scrap is in strong demand and prices are somewhat higher. Heavy cast scrap is likewise very firm, with a sharp demand from New England foundrymen. Details are given elsewhere in this issue of the bids received by the Isthmian Canal Commission at Washington last Thursday on Panama scrap. The award has not yet been announced. Quotations are as follows per gross ton, New York and vicinity:

| | |
|---|---|
| Rerolling rails | $16.50 to $17.00 |
| Old girder and T rails for melting | 15.25 to 15.75 |
| Heavy melting steel scrap | 15.25 to 15.75 |
| Relaying rails | 22.50 to 23.00 |
| Standard hammered iron car axles | 23.00 to 23.50 |
| Old steel car axles | 20.50 to 21.00 |
| No. 1 railroad wrought | 17.50 to 18.00 |
| Wrought iron track scrap | 16.00 to 16.50 |
| No. 1 yard wrought, long | 16.00 to 16.50 |
| No. 1 yard wrought, short | 15.50 to 16.00 |
| Light iron | 9.50 to 10.00 |
| Cast borings | 10.00 to 10.50 |
| Wrought turnings | 12.00 to 12.50 |
| Wrought pipe | 14.50 to 15.00 |
| Old car wheels | 15.50 to 16.00 |
| No. 1 heavy cast, broken up | 14.50 to 15.00 |
| Stove plate | 12.50 to 13.00 |
| Locomotive grate bars | 12.50 to 13.00 |
| Malleable cast | 15.50 to 16.00 |

The firm of Buell & Mitchell, 120 Liberty street, New York, merchant in iron and steel and machinery castings, has been dissolved by mutual consent, and Mr. Buell will continue the business under the name of Wallace Buell & Co. at the same address.

## Metal Market.

NEW YORK, September 22, 1909.

**Copper.**—The copper sellers are more cheerful than they were a week ago, and it is evident from the inquiries that are coming in that there are a number of people interested, and some buying is expected to result. It is our impression that copper at this time is a better buy than a sale, notwithstanding the market's unfavorable features. It is true that stocks have increased, but notwithstanding this fact those who have the metal to sell refuse to make any great concessions. Electrolytic copper is not particularly strong, however, and plenty of it can be obtained for 13c., and perhaps slightly under that price. Lake copper is bringing from 13.25c. to 13.50c., although the resale lake copper, mentioned last week as being offered at around 13c., is still going begging. The holders are not worrying over the matter, however, and they declare that it will be worth while to keep it and wait for a better price rather than to dispose of it at anything under 13c. In London to-day spot copper brought £59 7s. 6d., and futures £60 5s. The sales made in London during the day amounted to 400 tons of spot and 1300 tons of futures. The market was easy.

**Pig Tin.**—The market has not recovered from the hammering it received from the speculative interests during the last two weeks, and the outlook is gloomy. There will be a Banca sale of 2000 tons September 29, and at this time that does not add any cheer to the situation, as it is generally admitted that the tin available for September will not all be required. Some people who recently bought more tin than they needed have been offering it below the cost of importation and it is apparent that they feel that the situation will not be bettered by an addition to the stocks in sight at this time. On Monday and Tuesday alone 1500 tons of tin were put down at the docks, and the total arrivals for the month will probably amount to 6500 tons. Of this it is not thought that more than 3500 tons will be required, so it can be seen that the surplus will be large. Prices established during the week were as follows:

| | Cents. |
|---|---|
| September 15 | 29.90 |
| September 16 | 30.20 |
| September 17 | 30.30 to 30.40 |
| September 20 | 30.15 to 30.25 |
| September 21 | 30.15 |
| September 22 | 30.15 |

Again the high price of the week was established on Friday and the buying done on that day was made in anticipation of an improved London market, as it appeared during

the last two weeks that conditions there were getting stronger. The speculators got busy again, however, and succeeded in pounding the price down a few points. To-day spot tin was sold in London for £138 and futures for £139 2s. 6d. The sales were 150 tons of spot and 130 tons of futures.

**Lead.**—Outside interests are cutting prices in lead. We hear of sales in St. Louis at 4.25c. and in New York at 4.32½c., regardless of the fact that the American Smelting & Refining Company continues to ask 4.40c. It is certain that lead can be bought in New York for 4.38c. and it has been offered cheaper than that price. The market price at St. Louis now is 4.30c.

**Tin Plate.**—The market is featureless. Reports of premiums being asked are more scarce and plenty of tin plate can be had at $3.64 for 100 lb. I C coke plates.

**Spelter.**—While there is a large stock of spelter available, which was bought in anticipation of changes in the tariff, those who have it to sell are optimistic and they are making quotations at from 5.85c. to 5.90c. The indications are that if anything happens in the spelter situation in the near future it will be a raise in price.

**Antimony.**—There has been a reduction in price, a result of a disappointing lack of demand, as it was expected that by this time that the railroads would be in the market for large quantities. Those expectations have not materialized. The consumption has been very poor of late and sellers have been unable to maintain the advances made in the last two weeks. Hallett's is now bringing 8.30c. and Cookson's 8.50c. Hungarian grades can be had at 7¼c., and it may be added that many importers who stocked up heavily, expecting a better demand, are discouraged over the outlook.

**Old Metals.**—The following dealers' selling prices represent the New York market:

| | Cents. |
|---|---|
| Copper, heavy cut and crucible | 12.75 to 13.00 |
| Copper, heavy and wire | 12.25 to 12.50 |
| Copper, light and bottoms | 11.50 to 11.75 |
| Brass, heavy | 9.00 to 9.25 |
| Brass, light | 7.25 to 7.50 |
| Heavy machine composition | 11.75 to 12.00 |
| Clean brass turnings | 8.25 to 8.50 |
| Composition turnings | 9.50 to 9.75 |
| Lead, heavy | 4.20 to 4.25 |
| Lead, tea | 3.90 to 3.95 |
| Zinc scrap | 4.15 to 4.25 |

**A New Agency for Foreign Ores.**—While in Europe recently Benjamin Nicoll of B. Nicoll & Co., New York, arranged for the latter to take the exclusive agency in the United States for the large ore and metal firm of Wm. H. Mueller & Co., The Hague, Holland, having branches also in Rotterdam, Amsterdam, Paris and London. The materials handled are Swedish and Spanish ores, ferromanganese and magnesite. Already B. Nicoll & Co. have sold 100,000 tons of ore, to be brought in this year. The new connection is an important one and promises to result in considerable further business.

Judge Hough in the United States Circuit Court, September 15, handed down a decision in the famous Selden automobile patent cases, sustaining the Selden patents, as against the Ford and the Panhard automobiles. The decision is of importance to the automobile trade, inasmuch as the Selden patents are so fundamental as to cover what Judge Hough calls "every modern car driven by petroleum vapor as yet commercially successful." It is asserted that the case will be appealed.

Georges de Ram makes a brief but strongly favorable report in the *Revue de Metallurgie* of a trial extending over a period of a year and a half of the Taylor system of working in a large shop in France.

Frederick Conlin has been made president of the S. L. Moore & Sons Company, a subsidiary of the Bethlehem Steel Corporation, succeeding C. D. Bradley.

Bids were opened at Washington, D. C., September 21, by the Navy Department for about $1,000,000 worth of guns of various sizes. The Bethlehem Steel Corporation and the Midvale Steel Company were the only bidders, the former being the lower on the 12 and 6 in. guns and the latter the lower on the 5-in.

All of the blast furnaces in the Mahoning Valley that make Bessemer pig iron are now running except Struthers Furnace, which will resume about October 15, after being relined and otherwise extensively repaired.

## Iron and Industrial Stocks.

NEW YORK, September 22, 1909.

The industrial stocks have proved the special feature of the week under review. New high records were made for quite a number. The common stock of the United States Steel Corporation steadily continues its upward march. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week has been as follows:

| | | | |
|---|---|---|---|
| Allis-Chalm., com.. | 15 - 15½ | Railway Spr., com. | 49 - 51½ |
| Allis-Chalm., pref.. | 53⅝- 54¼ | Republic, com. | 40 - 44¾ |
| Beth. Steel, com.. | 35 - 36¼ | Republic, pref. | 107 -109½ |
| Beth. Steel, pref.. | 67 - 68 | South. I. & S., com. | 19 - 19¾ |
| Can, com. | 12¼- 13⅛ | South. I. & S., pref. | 52⅜- 54⅞ |
| Can, pref. | 82 -*84 | Sloss, com. | 87½- 90½ |
| Car & Fdry, com.. | 69½- 70¾ | Sloss, pref. | 118½-119 |
| Car & Fdry, pref.. | 118¾-119¾ | Pipe, com. | 32½- 34¾ |
| Steel Foundries... | 60½- 62 | Pipe, pref. | 84½- 86¾ |
| Colorado Fuel.... | 45⅛- 47½ | U. S. Steel, com.... | 82⅝- 85 |
| General Electric... | 166 -168 | U. S. Steel, pref... | 126¾-129 |
| Gr. N. ore cert.... | 82½- 84¾ | Westinghouse El.. | 86 - 87½ |
| Int. Harv., com... | 88½- 95 | Va. I., C. & C..... | 68½- 75⅞ |
| Int. Harv., pref... | 120 -121 | Chi. Pneu. Tool... | 32½- 33 |
| Int. Pump, com... | 48 - 49⅜ | Am. Ship, com..... | 63 - 64 |
| Int. Pump, pref... | 89 - 91¾ | Cambria Steel..... | 44⅝- 49½ |
| Locomotive, com... | 59⅜- 61½ | Lake Sup. Corp... | 26¼- 27½ |
| Locomotive, pref.. | 116 -118⅝ | Warwick ..... | 10¼- 10½ |
| Nat. En. & St.,com. | 20¼- 23 | Crucible St., com.. | 13⅝- 14¾ |
| Nat. En. & St., pref.... | 98¾ | Crucible St., pref.. | 81¾- 84⅜ |
| Pressed St., com... | 50 - 51½ | La Belle I. W.... | 149¾-150 |
| Pressed St., pref... | 106½-107½ | Harb.-W. Ref., pref..... | 95 |

* Ex dividend.

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 84⅞, preferred 129¼, bonds 105⅝; Car & Foundry common 69, preferred 118¾; Locomotive common 59⅞, preferred 115¾; Steel Foundries 60½; Colorado Fuel 46; Pressed Steel common 49⅞, preferred 107¼; Railway Spring common 49¼; Republic common 45¼, preferred 108⅞; Sloss-Sheffield common 89; Cast Iron Pipe common 33½, preferred 85½; Can common 12⅞, preferred 82⅝. Earlier in the day United States Steel common sold up to 86¼, and Republic common up to 46.

A Cincinnati dispatch of September 17 says that the common stock of the American Rolling Mill Company sold on that day at 375, against 350 the preceding day and 287½ the week previous. It is stated that a stock dividend of 100 per cent. will be paid to the holders of common shares and the dividend rate will be increased from 10 to 12 per cent. on the common stock. The capital stock after the increase will be $3,000,000.

### Iron and Steel Bonds.

Chisholm & Chapman, 18 Wall street, New York, furnish the following quotations:

| | Bid. | Asked. |
|---|---|---|
| Bethlehem Steel 1st ext. 5s, due January, 1926 | .. | 89¼ |
| Bethlehem Steel purchase money 6s, August, 1998 | .. | 117 |
| Buffalo Iron 5s, October, 1925 | 95 | 100 |
| Buffalo & Susquehanna Iron 1st 5s, June, 1932 | 99¾ | .. |
| Buffalo & Susquehanna Iron deb. 5s, January, 1926 | 94 | .. |
| Dominion Iron & Steel 5s, July, 1929 | 96½ | 98 |
| La Belle Iron 1st 6s, December, 1923 | 104½ | 106½ |
| Lackawanna Steel 1st 5s, April, 1923 | 98¼ | .. |
| Maryland Steel 1st 5s, February, 1922 | 102 | .. |
| Pennsylvania Steel 1st 5s, November, 1917 | .. | 103 |
| Pennsylvania & Maryland Steel 6s, September, 1925 | .. | 110½ |
| Republic Iron & Steel 1st 5s, October, 1934 | 100⅝ | 102 |
| Sloss Iron & Steel 1st 6s, February, 1920 | 107 | 109 |
| Sloss Iron & Steel consol. 4½s, April, 1918 | 95½ | 96½ |
| Jones & Laughlin 1st 5s, May, 1939 | 102¼ | 102¾ |
| *United States Steel Corporation.* | | |
| Collateral Trust 5s, Series A, C, E, April, 1951 | 114¾ | 115¼ |
| Collateral Trust 5s, Series B, D, F, April, 1951 | 114¾ | 115¼ |
| Sinking Fund 5s, April, 1963 | 105¼ | 105½ |
| Union Steel 1st 5s, December, 1952 | 105 | 105½ |
| Clairton Steel 5s, 1908-1913 | 101 | .. |
| St. Clair Furnace 1st 5s, 1910-1939 | 101 | .. |
| St. Clair Steel 1st 5s, 1908-1926 | 101 | .. |
| Illinois Steel deb. 5s, January, 1910 | 100 | .. |
| Illinois Steel 5s, April, 1913 | 100 | .. |

All bonds quoted " and interest."

**Dividends.**—The Crucible Steel Company of America has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable September 30.

The American Shipbuilding Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable October 15.

The Otis Elevator Company has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable October 15. On the same date there will also be paid to common stockholders of record of September 30 the second installment of 1½ per cent. on the dividend of 3 per cent. declared on the common stock, March 12.

Manning, Maxwell & Moore, Inc., have declared the regular quarterly dividend of 1½ per cent., payable October 1.

The E. W. Bliss Company has declared the regular quarterly dividend of 2 per cent. on the preferred stock and 2½ per cent. on the common stock, payable September 30.

The International Nickel Company has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable November 1, and a dividend of 1 per cent. and an extra ½ per cent. on the common stock, payable December 1.

# The Machinery Trade.

NEW YORK, September 22, 1909.

Business with machinery houses has increased considerably and is now steadier and at a much higher level than it was some time ago. This is especially noticeable with houses building or handling well known lines of standard tools and who cater to the buyers of high class machines. The demand for the more cheaply constructed tools does not appear to be quite as brisk as that for machines with the most modern improvements. This tendency on the part of buyers to get the best and the fact that regular customers who have bought but little the past two years are coming into the market quite freely are encouraging features of the trade. Another factor indicative of a resumption of a more active demand is the covering of inquiries without much hesitancy. Merchants report that their salesmen are busy following up inquiries and that orders are secured with less delay—in other words consumers are more eager to get tools. The increased activity in the demand is undoubtedly due to some extent to the threatened extension of deliveries. Much is now heard in the trade on this phase of the situation and deliveries on certain tools are getting farther away, while other machines are being taken off the list of those for immediate delivery. The past week business was much better both as regards inquiries and orders. Few large propositions were reported, but much business covering sizable lots of tools was transacted. From a reliable source it is learned that several railroads will soon enter the market for considerable mechanical equipment.

It would not surprise many in the trade to hear of some general advances in the price of machine tools, as there is evidence of a stiffening tendency on the part of manufacturers. They are gradually withdrawing concessions, and taking into consideration recent advances in the price of raw material it is looked upon as highly probable that better prices will be asked before long.

An advance of 10 per cent. has been made in the price of leather belting by most of the manufacturers, and in consequence some of them are taking pains to explain to their customers the reason for the advance. In that connection a prominent leather belting manufacturer stated this week that pending the discussion of the tariff the impression was more or less prevalent that the removal of the duty on hides would result in a considerable reduction in their selling price, and for a brief period preceding and following the enactment of the tariff bill there was a slight recession in market values. The early result, however, was a considerable advance in all foreign markets from which this country imports hides and a consequent hardening of the domestic market. This is especially true of native steers, the hides of which are used exclusively in the standard grade of belting butts. Such hides now command record prices. The causes of these conditions, it is explained, are the world's scarcity of hides and the increased demand for leather for uses which did not exist 10 years ago. This is noticeably true of the automobile business. Aside from the greater cost of hides, manufacturers state there is an increased cost of production which has also influenced the advance.

### Important Machinery Requirements.

The Remington Typewriter Company, 325 Broadway, New York, is arranging the details for an extensive addition to be made to its factory at Ilion, N. Y. A list of the machinery equipment is now being prepared and will shortly come before the trade. The machinery requirements will include an additional power unit of a capacity not yet decided upon and machine tool equipment which will amount to about $50,000. The details are in the hands of the factory superintendent.

The General Electric Company, Schenectady, N. Y., is spending a large amount of money on machinery to be added to its plant there. Some extensive orders have been placed in New York for machine tool equipment, and those close to the affairs of the company say that more is to be bought. It is understood that the entire expenditures will aggregate in the neighborhood of $100,000. The buying is being done from Schenectady.

The railroads appear to be entering the market more freely and lists of tools are expected shortly from several of the roads. The Virginian Railroad has issued a list covering about 25 tools. This road, it is understood, is to construct a repair shop at Princeton, Va., and a roundhouse and repair shop at Roanoke.

It is understood that the Chesapeake & Ohio Railroad is preparing a list of tools with the intention of submitting it to the trade for bids at an early date. The road recently made a number of improvements to its shops at Huntington, W. Va., including the erection of a new planing mill, the conversion of the old planing mill into a boiler shop, a new power house, extension to the blacksmith shop and a new storehouse and office building. The construction of new shops at Richmond, Va., has been under consideration for some time. J. F. Walsh is superintendent of motive power, with headquarters at Richmond.

Improvements are to be made to the plant of the Baltimore & Ohio Railroad at Benwood Junction, W. Va., which will mean practically the rebuilding of the shops at that point. The improvements, which are expected to be completed by February, will include a new machine shop, blacksmith shop, boiler and engine room, 64 x 184 ft., with a brick stack 125 ft. high; 80-ft. turntable and pit; carpenter shop, 35 x 82 ft.; standard 95-ft. engine house, with 23 stalls; oilhouse, 30 x 58 ft.; storehouse, 30 x 70 ft., with platform 20 x 30 ft.; sandhouse, 22 x 94 ft., with tower 13 x 15 ft.; material storage platform, 25 x 90 ft.; shaving shed, 12 x 33 ft.; casting storage platform, 38 x 60 ft.; pipe, bar, iron and sheet material storage racks, 20 x 38 ft.; scrap bins, 20 x 42 ft. and 20 x 70 ft.; locomotive cleaning platform, 19 x 75 ft.; new system of water supply and fire protection and sewerage system. The larger buildings will be of brick and concrete construction.

The Public Service Railway Company of New Jersey will probably need some machine tools and other machinery for equipping a repair shop which is to be erected at South Nineteenth street and South Orange avenue, Newark, N. J. The building is to be 60 x 180 ft. and will be of brick, with mill construction. L. C. Becker & Brother of Newark, N. J., have been awarded the contract for the construction of the building, but the machinery, it is understood, will be purchased by the company's engineering department. The main offices of the company are in the Prudential Building, Newark.

Ground will be broken within the next month for the new plant to be erected by the Norfolk Portland Cement Company, recently incorporated at Norfolk, Va. The new company, which is a subsidiary of the American Cement Company, Philadelphia, Pa., will erect a plant to occupy 12 acres of ground, and which will cost approximately $650,000. The officers of the new company are Robert A. Griffith, president; F. J. Jiggins, vice-president; J. F. Lenning, secretary, who with Robert W. Leslie, president of the American Cement Company; George W. Norris of E. B. Smith & Co., Philadelphia; Richard B. Taylor and J. M. Ustadter of Norfolk, constitute the Board of Directors.

The Cataract Motor Company, Colt Building, Paterson, N. J., has been incorporated with a capital stock of $350,000 to manufacture motors, transmissions and automobile parts. It is the intention at the beginning to build from drawings and specifications furnished by its customers and not limit its products to a special design of motor. An option has been secured on a large tract of land in Paterson, where it is the intention to erect a plant to be equipped with modern machinery for the manufacture of gasoline engines and other accessories. Louis A. Piaget is president; William H. Sherman, vice-president; George E. Hannah, treasurer, and Harris H. Westerhoff, secretary.

Construction of pumping plants for water works systems or extensions has recently been authorized at Lisbon Falls, Maine; Jamestown, Kan.; Uehling, Neb.; Chattanooga, Tenn.; Mission Ridge Station; Nampa, Idaho; Winona, Minn.; Toronto, Ont.; Sacramento, Cal.; Shirley, Ind.; Imperial, Cal.; San Pedro, Cal. (fire service); Faulkton, S. D.; Bellingham, Wash.; Silver Beach Station, Franklin, Tenn.; Weston, Ore.; Mansfield, Ohio; Barker, N. Y.; Oaxaca, Mexico; Newport, Ky.; Roosevelt, Okla.; Moberly, Mo.; Hancock, Mich.; Sarasota; Gaffney, S. C.; Wagner, S. D.; Seymour, Iowa.

Plans are being prepared, but construction work has not yet been authorized, for municipal plants as follows: Power and lighting stations at Coaticook, Que.; Ft. Pierce, Fla.; Lacombe, Ala.; Chewelah, Wash.; Sylvan Beach, N. Y.; Arlington, S. D.; Hartsells, Ala.; Valley City, N. D.; water works at Sand Point, Idaho; Meridian, Idaho; Park City, Utah; Lakeland, Fla.; San Francisco, Cal.; Van Ness pumping station; Uehling, Neb.; Fithian, Ill.; Ennis, Texas; Johnson City, Tenn.; Sherman, Texas; Oak Cliff, Texas; Shrewsbury, Pa.; Gotebo, Okla.; Beaverton, Ore.; Middletown, Pa.; Springfield, Mo.; Mattoon, Ill.; Valentine, Neb., and Shelbina, Mo.

New electric traction systems, construction of which is contemplated or has recently been determined upon, are the Oakland & Antioch Railway, Oakland, Cal.; Beaver Falls line of the Milwaukee (Wis.) Electric Railway & Light Company; Nebraska Central Railroad, Lincoln, Neb.; Stillacoom (Wash.) Electric Line, promoted by Stone & Webster Company, Boston; Bedford, Fulton & Franklin Street Railway Company, Harrisburg, Pa.; Tippecanoe & Monticello Interurban Railway, Monticello, Ind.; Redlands & Yucaipa Electric Railway, Redlands, Cal.; Newport News & Yorktown Railway Corporation, Newport News, Va.; Iowa Electric Railroad Company, Marshalltown, Iowa.

## New England Machinery Market.

BOSTON, MASS., September 21, 1909.

Although there is a steady volume of orders, business with the local dealers has not yet developed the expected autumn improvement. The machinery builders are very busy, but their orders are coming from other sections of the country. New England is not yet buying machine tools in large numbers, nor is New York City sending its proportionate share of business as compared with the Middle West, and, to a less pronounced degree, with Pennsylvania. This is regarded as only a temporary condition, however, for the users of machinery are getting to be very busy. It looks as though some of them would regret their delay in entering the market. The machinery builder who is not booking a great deal more business than he did a few months ago is a rare exception, although occasionally a house reports a slight let-up, which may be accounted a coincidence affecting the individual rather than an indication of a general trend of the market.

The reports of machinery manufacturers published in this column a week ago, all telling of a great improvement, have been accentuated by the letters of others since received. They demonstrate that conditions are mending with almost extraordinary rapidity. Difficulty in securing good labor is holding back production, but this is gradually being overcome as the futility of the hope of securing the best men is realized, and the effort is begun to accept conditions as they are and make the best of the situation.

The tool steel trade is more active. A prominent Boston house dealing exclusively in imported tool steel finds business growing constantly, customers having abandoned their depression policy of buying only for imperative requirements. The Middle West branches of this house make the same report. Only the possession of unusually large stocks relieves the fear of a deluge of business. Prices in the tool steel trade remain constant, excepting for the necessary readjustment resulting from the new tariff, which is an increase.

Ricketts & Bermingham, No. 522 Tremont Building, Boston, have been organized under Massachusetts laws to put on the market an incinerator for the destruction of garbage and refuse in residences, apartment blocks, hospitals, hotels, &c., and to acquire the New England rights of the Dryer Mfg. Company, New York, which manufactures clothes dryers. James B. Ricketts is the president and James Bermingham secretary and treasurer. The company's products will be manufactured by outside parties, for the present at least.

The attitude of the machine tool builders as to the contract feature of orders seems to have undergone something of a change during the past two years as a result of their unfortunate experience in the cancellation of orders when the slump came. It has always been the custom to permit customers, both users and dealers, to rescind their orders, or to grant the request that work upon them be held up when it happens that they are no longer needed. The sentiment has grown that this has gone to lengths which good business principles do not warrant. A terse exposition of this aspect of the question is contained in a letter sent by a machine tool builder of the Middle West to his dealers regarding stock orders:

"We feel that this is an opportune time to announce our definite policy regarding the acceptance and fulfillment of stock orders, for the indications are that we are returning to the conditions of two and three years ago, when the utmost capacity of our plant was covered for many months ahead, largely by stock orders from our agents. Our recollection is still vivid of that two weeks in October, 1907, when a whole year's business was wiped off our books, and 15 months dwindled to three months in total of unfilled orders which we had faithfully entered and planned to fill as promised, whether in the meantime resold to customers or not, and this at the expense of being compelled to refuse many a positive order dependant upon prompt delivery. Naturally, we desire to avoid a repetition.

"We wish it understood that we do not believe in the policy advocated by some prominent manufacturers, of refusing to recognize stock orders when the plant is rushed, but only orders for definite shipment to, or for, users of the machines. On the contrary, we regard our agents as our best customers. We are glad to receive any stock orders which our agents feel free to send us, and enter the same in the order of receipt, and we try to give at least approximate deliveries, which we intend to adhere to, and which can be depended upon in quoting customers. In return for this it is only fair that we insist that such orders are not subject to promiscuous cancellation; that the agent guarantee his acceptance of all machines, as completed on his orders, and when such machines are completed, whether sold or for stock, we are authorized to ship, or at least to invoice, forthwith.

"If for any reason any of our agents are not agreeable to this, we would state: Any stock orders received, not subject to these conditions, will be entered as usual, and deliveries named, but such deliveries will be subject to possible change. Preference will invariably be given to orders we can positively depend upon—*i. e.*, to all orders for nonshipment to or for users of machines; to stock orders subject to the conditions of acceptance outlined above."

The directors of the Pratt & Cady Company, Hartford, Conn., have issued the statement that "they have decided not to recommend to the company's stockholders the proposed sale of its assets to the Chapman Valve Company, Indian Orchard, Mass. The Pratt & Cady Company will, therefore, remain in Hartford and continue in the valve and hydrant business. The finances of the company are in strong condition, the present business is good and the prospects for a larger and increased business in the near future are very encouraging." It had been supposed generally that the consolidation of the two companies was practically an assured fact. The Chapman Company stockholders had ratified the sale, the purchase price being fixed at $400,000, this not including the real estate. The companies manufacture similar, and, in some cases, competing lines, and the idea of the projectors of the amalgamation was that the business could be combined very effectively.

The Bullard Machine Tool Company, Bridgeport, Conn., manufacturer of boring mills and other machine tools, will erect a new building, 56 x 142 ft., with crane section running the full length, equipped with a 10-ton Pawling & Harnischfeger crane, and with a gallery at one end. The building will be utilized for the receiving and cleaning of castings, and no machinery will be installed, as no manufacturing will be carried on in the structure. It will be connected with the main shop by an industrial railroad system. It is expected that the building will be ready for occupancy December 1.

Improvements at Fort Andrew, Boston Harbor, include an ordnance repair shop, for which, of course, machinery will be required later.

The Portland Electric Light & Power Company, Portland, Maine, is to make large increase to its power facilities, according to a dispatch from Sanford, Maine, in order that it may furnish the Sanford Mills with 2000 hp. in electric energy. The company's present equipment at West Buxton, Maine, develops 3000 hp., which is all contracted for in Portland. In order to meet the new demand it is proposed to develop a large water privilege at Bonny Eagle and to establish at West Buxton an auxiliary steam plant of 2000 hp. capacity to take care of the contract at times of low water.

J. H. S. Jones, Bridgeport, Conn., manufacturer of showcases and store fittings, is rebuilding the factory recently destroyed by fire. A boiler and engine house will be built later.

The Amoskeag Mfg. Company, Manchester, N. H., cotton manufacturer, is to build a large power plant to provide electric power for a large mill now under construction, and also three present mills of the company.

The Yankee Wood Turning Company, Huntington, Conn., has been incorporated with a Connecticut charter to manufacture wooden articles in a factory to be located in Maine. The incorporators are Edward Harriman, New Haven, Conn.; Alfred Baldwin, Huntington, and Harold Drew, Ansonia, Conn.

The Chandler Planer Company, Ayer, Mass., manufacturer of metal planers, is employing additional men, with the intention of increasing the working force to 100 in the immediate future. An important contract for outside work has just been taken, which promises to take care of surplus capacity for the next year, and this, coupled with new planer orders, assures a busy season. The plant was shut down entirely during 1908, so that the improvement is a notable one.

The bolt and nut manufacturers of New England are rushed with business. They report that the demand comes from a very wide diversity of industries, including builders of every description of machinery. The improvement has been very marked in a few months. The bolt and nut people are placing generous orders for raw materials, following the general trend of business in insuring deliveries well ahead of requirements.

Announcements of improvements in general manufacturing plants, outside of the metal industry, include the following: Providence Brewing Company, Providence, R. I., addition to boiler and engine house, 40 x 45 ft., one story, and building 70 x 90 ft., both being parts of a cold storage warehouse; Farr Alpaca Company, Holyoke, Mass., extension of new building already under construction, to provide capacity calling for the employment of 500 hands; Wonalancet Company, Nashua, N. H., new mill; Stonington Building Company, Stonington, Conn., additional mill building for the American Velvet Company, 100 x 165 ft.; Pawtucket Valley Textile Company, Pawtucket, R. I., silks, planning to substitute electric drive for present power plant; new cotton finishing mill at East Wareham, Mass., by a new company of which John W. Knowles, treasurer of the Page Mill, New Bedford, Mass., and Eugene S. Graves, recently instructor

in the New Bedford Textile School, are the heads; James J. Casey, Holyoke, Mass., carriage factory, 40 x 80 ft., three stories; Automatic Printing Company, Bridgeport, Conn., two-story building, 30 x 50 ft., equipped with gas engine.

## Chicago Machinery Market.

CHICAGO, ILL., September 21, 1909.

Though unmarked by any individual transactions of unusual importance, last week's trade in machinery lines was of volume and character indicating that the market is keeping step with general expansion. The leading machine tool houses, encouraged by a well sustained demand, hold optimistic views as to the future. For some time trade has been centered upon a limited line of tools covering the requirements of automobile builders, and it is only within a comparatively recent period that there has been much call for general shop tools, such as lathes, planers, shapers, &c. The fact that such tools are beginning to move more freely is regarded as an unmistakable indication of growing activity in general lines of manufacture. But few factories making such tools are as yet behind hand on deliveries, and buyers are able to secure reasonable deliveries. How long this condition will exist depends entirely upon the rate and urgency of demand. With no large stocks to draw from, any considerable increase would result in delay in the execution of orders which on some other tools is even now quite pronounced. A fair amount of business is being done in second-hand tools, but dealers complain of difficulty in securing salable stock of this kind. The trouble seems to be that buyers of second-hand tools are not interested in out of date styles and patterns. Such radical improvements have been made in machine tools within the past few years that many machines in good condition are so far outclassed by new ones of the same type as to be practically obsolete. Lathes, for instance, with solid spindle and without cross feed, &c., are hard to dispose of. There seems to be a strong tendency toward further advances in the price of machine tools, especially by makers who are over sold for several months ahead. Higher labor costs appear to be inevitable owing to the better scale of wages obtainable by machinists in automobile shops, and it is argued that the margin of profit afforded by current selling prices is too slender to sustain this additional burden. Whatever the outcome may be, it is certain that the prices are firmer all along the line than they have been for some time.

A considerable portion of the equipment for the new Pullman shops, now in course of construction, is yet to be purchased. It is understood that the orders thus far placed include principally the heavy and special tools, for which liberal time allowance had to be made for delivery.

In furtherance of its purpose to concentrate its manufacturing interests at the Hawthorne Works, Chicago, the Western Electric Company is erecting a one-story building, 50 x 170 ft., of steel and brick construction, plans for which were drawn by F. E. Davidson, architect, Chicago. This building forms an addition to the armoring plant and will be used for the manufacture of large cables which have heretofore been made in the New York factory. Included in the new equipment to be installed in this addition are three electric traveling cranes of 50, 20 and 2 tons capacity each. Bids are also being taken by the same company on the construction of a steel oil house 40 x 60 ft., five stories, which is to be equipped with pumps and oil handling apparatus.

Upon a site secured at Garrison and Franklin avenues, the St. Louis Carbonating & Mfg. Company, St. Louis, Mo., is preparing to build a three-story factory, 135 x 160 ft., which is to be equipped with about $75,000 worth of machinery for the manufacture of soda fountain apparatus and fixtures. The company is also increasing its facilities for the manufacture of bank fixtures and other work of a similar character.

Bids have gone in for the erection of a grain warehouse and elevator, 54 x 102 ft., to be built at 6416 Wentworth avenue, by A. F. Walthers, Chicago. According to plans prepared by F. E. Davidson of Patterson & Davidson, Chicago, the machinery for this building will include weighing, automatic unloading and conveying apparatus and electric motors, none of which, it is understood, has as yet been purchased.

The Pacific Metal Works, Portland, Ore., has secured a site for and will at once begin the erection of a new plant, which will consist of a foundry, 30 x 70 ft., of steel and concrete construction, and a warehouse, 100 x 100 ft., of brick and heavy mill construction. Enough new machinery will be added to the foundry equipment to double the daily output of solders and babbit metals. As soon as the two-story warehouse is completed, the jobbing stocks of tin plate, galvanized and black sheet steel, sheet copper and tinners' supplies carried by the company will be largely increased. The new plant will probably be ready for occupancy by November 1.

The Manley-Landreth Machinery Company, Joplin, Mo., dealer in new and second-hand machinery and mining supplies, has been succeeded by the Landreth Machinery Company. W. H. Landreth is president of the new organization.

The Sullivan Machinery Company, Chicago, announces the appointment of the Northern Canada Supply Company, Ltd., Cobalt, Ont., as its agent in territory embracing Cobalt and other Ontario mining districts. Special attention will be given to the sales of Sullivan rock drills, hammer drills, air compressors, diamond core drills, &c., in this territory by Robert T. Walker, in behalf of the Northern Canada Supply Company, with which he is connected. A liberal stock of these machines and their parts will be maintained at Cobalt, with a view to facilitating the prompt execution of orders.

Owing to circumstances which has made it necessary to draw new plans to meet new conditions, the invitation issued by the Constructing Quartermaster, Fort Logan, Colorado, for bids for the remodeling of the pumping plant and its equipment for either steam or electric power, have been withdrawn. These bids were to have been opened September 22, but redrawn plans will be submitted and new bids called for in the near future.

The Cheyenne Light, Fuel & Power Company, Cheyenne, Wyo., is making important improvements in its gas and electric light plants, which will include the installation of a new 600-hp. Franklin water tube boiler and a bench of six Parker, Russell Company's retorts in the gas house. In addition to this the company intends to install a 500-kw. direct connected unit, which is yet to be purchased.

The Handlan-Buck Mfg. Company, St. Louis, Mo., recently secured an order for about $25,000 worth of tools to be installed in the new forge plant of the Waterloo Drop Forge Company, Waterloo, Iowa. The order includes heavy drop forge presses, lathes, planers, shapers, drill presses, electric motors and miscellaneous equipment necessary for a complete drop forge plant. The Waterloo Drop Forge Company manufactures high grade drop forgings of all kinds and has a number of patented devices which it will shortly place on the market.

## Philadelphia Machinery Market.

PHILADELPHIA, PA., September 21, 1909.

Business still continues of a rather irregular nature. Purchases of equipment in any quantity for new enterprises are few and far between, the greater proportion of the orders placed being for single tools for minor extension or replacement. Manufacturers continue to transact a somewhat larger volume of business than do the merchants, but orders are also usually confined to single tool propositions. There is a decided improvement in the volume of inquiries, but there appears to be more or less delay in placing actual orders. As users of tools become more and more fully engaged their requirements in the way of equipment expand, and a good share of the present inquiries is of a nature which will require somewhat greater general activity before they develop into actual business.

Merchants' sales during the week have been confined pretty generally to the usual run of standard tools; lathes, planers, milling machines and drill presses have been the most active, and transactions have been largely in tools of the medium and smaller sizes. A most optimistic view of the situation is being taken by the trade, even though the immediate volume of business has not been large. The continued general betterment in the iron and steel trades, as well as in general industrial lines, lends material encouragement. Shipyards, locomotive builders and heavy engine builders show steadily increasing activity. Steel makers are operating plants to their full capacity, while machinery and tool builders, although all are not yet fully engaged, report a marked betterment in conditions. Crude and finished materials are steadily advancing in price, and while an upward tendency is shown in the selling prices of some classes of machine tool equipment, sharp advances have not yet been recorded, although higher prices are anticipated in a number of lines. The demand from abroad shows no appreciable change. Inquiries are light and no business of importance has been transacted in tools of the standard types. Some few orders for special equipment have been taken, and the demand for power transmission specialties is reported to be somewhat improved.

The second-hand machinery market has been rather dull. Transactions have been unimportant and confined largely to business of a day to day character. The demand does not appear to be specialized, but covers the general line of wood and metal working tools of the medium and smaller sizes. Second-hand boilers show no special movement, while the demand for the smaller engines is practically at a standstill.

More activity is to be noted in the foundry trade. Steel casting makers report a better volume of business, but prices have not yet reached a satisfactory level. Gray iron

jobbing foundries are more active, while those making a specialty of machinery castings are taking on a better volume of business. Few, however, have yet attained the full capacity basis.

Herman L. Winterer, who for nearly 18 years was connected with Frank Toomey, Inc., machinery merchant, during a large portion of which time he acted as manager, has severed that relation and will engage in the business of handling boilers, engines, dynamos and machinery of every description, opening a temporary office at 326 Richmond street, Philadelphia.

The Washington, Baltimore & Annapolis Electric Railway Company, Baltimore, Md., is receiving bids for the construction of a new substation and power house to be built at Ardmore, Md. The building will be of brick and concrete construction.

A sale of old material, comprising pumps, engines, boilers, blocks, tools and general equipment, belonging to the navy yard, Philadelphia, will be disposed of by sealed proposals, which will be opened October 6. Schedules showing equipment, terms, &c., can be obtained from the general storekeeper, navy yard, Philadelphia.

The Bateman Mfg. Company, maker of farm and garden implements, Grenloch, N. J., is in the market for a triplex pump, about 300 gal. capacity, motor driven, 220 volt, direct current; a Peck drop hammer, 300 to 400 lb.; 15 or 18 in. between ways, and a Fox turrent lathe. All this equipment must be modern and in good condition.

The Director of Public Works, Philadelphia, opened on the 15th inst. proposals for the erection of three city bridges, branch sewers and castings in connection with them. Two of the bridges are to be of steel plate construction, the third a concrete encased highway bridge. Bidding was quite active and the various proposals were ordered scheduled. The awards are expected to be announced in a few days.

The Depot Quartermaster's Office, Twenty-sixth street and Gray's Ferry road, Philadelphia, will receive bids until September 30 for the installation of two Haslet spiral steel chutes in the storehouse of the depot. Bids for steel chutes of other makes will also be considered. Specifications and full information may be obtained upon application to Major Chauncy B. Baker, depot quartermaster, at the above address.

The Royersford Foundry & Machine Company, Royersford, Pa., notes a steady improvement in the volume of business and expects very shortly to go on full time in all departments. The betterment recently has been largely in its various power transmission specialties; inquiries for punch and shears, however, have improved very considerably and a good volume of business for equipment of that character is expected in the near future.

## Cleveland Machinery Market.

CLEVELAND, OHIO, September 21, 1909.

While no inquiries have come out during the week involving a large list of machine tools, machinery houses report a good volume of small orders. The demand is largely for small and medium sized tools. The market has broadened to such an extent that there is now a fairly good demand from all lines of industry that use machine tools. With the present satisfactory condition of business in practically all lines and the bright outlook for the future, managers of manufacturing plants are no longer holding back but are placing orders for tools actually needed and inquiries are now usually followed by the prompt placing of orders. With the possibility of delayed deliveries future requirements are being anticipated and some orders have been placed with local tool builders for delivery after the first of the year. With improved business conditions there is an increase in the number of small concerns that are being formed to engage in manufacturing in metal working lines and an improvement is expected in the demand for tools from new buyers. The demand for steam and electric power equipment and gas engines is quite active, orders being largely for small units. Builders of foundry equipment report a good volume of orders from new companies and from others that are enlarging their plants, and a large volume of inquiries. There is an improvement in orders from railroads for small lots of tools for repair shop work.

The local manufacturing situation continues to improve in nearly all lines. Many plants are being operated overtime and there are but few that are running at much less than their full capacity. The machine tool builders are running their plants practically full and some are getting behind on deliveries. In heavy machinery conditions have not improved so rapidly, but plants engaged in the manufacture of heavy handling machinery report a good volume of small work on hand and a decided improvement in the volume of inquiries for large installations. The demand for locomotive cranes shows much improvement, the railroads now buying quite freely. The demand for electric cranes is fairly good.

The Van Dorn Electric Mfg. Company, Cleveland, has installed considerable additional machinery and has doubled its capacity since last April. The company is now paying more attention to electric reamers than it has been and it is getting very satisfactory encouragement in this line through the receipt of a large number of orders. The selling organization of the company is now in charge of A. N. Frecker, as sales manager. Mr. Frecker was formerly Eastern sales manager of the company, with headquarters in New York. The company is now very busy in all of its departments.

The Van Loozen Automatic Printing Press Company, Cleveland, will move its plant to Bucyrus, Ohio, where a new company, known as the Van Loozen Multicolored Printing Press Company, is being organized, with a capitalization of $150,000, to carry on the business, a number of Bucyrus men having become interested in the company. A new plant is being built in Bucyrus, 44 x 150 ft. It is expected that the plant will be completed in about 30 days. The company is in the market for a number of machine tools, including lathes, planers, drills and milling machines. F. H. Van Loozen is president.

The Van Dorn Iron Works Company, Cleveland, reports a large amount of work on hand in all departments. This company now has under contract in its jail work department over 400 cells for the Allegheny County (Pa.) Workhouse, and for cells for jails in Baltimore and Rochester, N. Y. Among other contracts recently received is one for steel furniture for the Pacific Mutual Life Insurance Building in Los Angeles, Cal.

The Cleveland Chain & Mfg. Company is building an addition to its plant, 50 x 175 ft., which will about double its present capacity. The company reports a great improvement in the demand for chain and is now rushed with orders. Among recent orders was one from the Government for blocks for use in work on the Panama Canal. This company is placing on the market a new lock weave weldless wire chain.

The Empire Novelty Company, Canton, Ohio, has been incorporated with a capitalization of $60,000, to manufacture toy locomotives, automobiles and a line of metal novelties. The company will erect a two-story brick factory, 36 x 100 ft., and expects to have it ready for operation about January 1. The incorporators are H. C. Ferguson, W. F. Weaver, A. H. Elliott, John C. Harmony and E. E. Steiner.

The Alliance Machine Company, Alliance, Ohio, has received an order for 21 steam hammers, with capacity ranging from 1000 to 12,000 lb., for the forge plant of the Buick Motor Car Company, Flint, Mich.

An appropriation of $250,000 was made by the Ohio Legislature some time ago for the remodeling of the State Penitentiary at Columbus, including the erection of a new power house. No money was available for equipping the new plant. The State Emergency Board has now allowed an additional sum of $82,350 for the power plant equipment, for which it is expected that bids will be received soon.

It is announced from Toledo that the Toledo Steel Castings Company, a new concern which succeeded the C. E. Sutton Company, will enlarge its plant considerably. The manager of the new company is F. E. Meek, formerly sales manager of the Detroit Steel Castings Company.

Contracts have been awarded for the erection of a large addition to the automobile plant of the Overland Company, Toledo, Ohio, the plant formerly owned by the Pope Company. A three-story building, 91 x 397 ft., will be erected, to be used as a finishing department and storeroom.

The Ohio Electric Car Company, Toledo, Ohio, has been incorporated with a capitalization of $75,000, to manufacture automobiles. The officers are A. M. Chesbrough, president; R. R. Lee, vice-president; James B. Bell, treasurer; Frank Suyday, secretary, and H. P. Dodge, general manager.

The Upson Nut Company, Cleveland, will enlarge the capacity of its power plant by the installation of new boilers, for which an order has been placed, and will shortly be in the market for an electric generating unit of about 500 hp.

The Lake Shore & Michigan Southern Railroad has placed a contract with the Wellman-Seaver-Morgan Company, Cleveland, for four 15-ton Hulett unloaders for the new ore docks to be built at Ashtabula, Ohio. The railroad company expects to purchase a Hoover & Mason ore bridge to be erected in connection with the plant. A power plant will be erected by the Lake Shore Railroad, the contract for the equipment for which will be placed shortly. The complete plant will involve an expenditure of about $800,000. It is expected that it will be ready for operation early next summer.

Houghton & Richards, Boston, Mass., importers of Bohler's Styrian steel and Farnley iron, have taken the store at 1394 West Third street, Cleveland, for its branch in that city, and is moving from 5812 Carnegie avenue. The new quarters are much larger than the old and are centrally located. The firm is carrying a much larger stock in Cleveland than ever before.

## Cincinnati Machinery Market.

CINCINNATI, OHIO, September 21, 1909.

Conditions in the local machinery market are all that could be desired from the sales viewpoint; it is in the shop that concern for the future, if any, is felt.

Between 25 and 30 tool manufacturing concerns are running full time, full force, and a half dozen or more on from 67 to 70 hr. per week. In some cases this overtime would not be necessary could the companies secure necessary skilled help. As it is, the employment register at the office of the Cincinnati Metal Trades Association contains requests from tool builders and machinery manufacturers generally for the greatest number of men at this season in the association's history.

Tool concerns are gradually getting rid of their special work taken on during the depression, much of it automobile work, and turning their attention to regular lines. A number of tool manufacturing establishments in this field have found it profitable to design special lathes, high speed ball bearing drills and similar machines, especially for the automobile trade. And those companies having these machines already in the market are finding a ready market for them as rapidly as they can be turned out. The large manufacturers of electric lighting, heating and power machinery are buying some tools, as are also the mining concerns in the West and Northwest.

The dealers are ordering machines in modest shipments and a little inquiry is beginning to come from Europe, which has been quite silent for some time on the tool question.

The second-hand machinery trade has suffered little diminution for two or three years, depressions and improvements in the times seeming to influence this trade but little, and there is always some buying and good prices are realized.

Jobbing foundries are all busy. The dull times of 1907 and 1908, during which tool manufacturers drew on any surplus stock of castings they may have had and ordered only as they needed them, left these establishments bare when the improvement came this year, and now some foundries, although working full forces full time, are not able to promise immediate deliveries.

The American Tool Works Company, Cincinnati, is running on a full time schedule and with a force of about 425 men. Until the new equipment which was ordered some time ago came in the company was forced to work several departments at night. Secretary Robert Alter, in speaking of conditions, stated that indications are for the best fall and winter business in the company's history.

President R. B. Goodrich of the Eagle Mfg. Company, Cincinnati, has just returned from a trip to the Yellowstone and is engaged with architects and contractors planning the erection of the company's new factory building at Blue Rock and Turrill streets, Cumminsville. So far as has been determined the structure is to be five or six stories in hight, 50 x 100 ft. Material will be concrete, with brick trimmings, and work will be pushed to completion. The name of the company was changed about two months ago from the Eagle Tool Company to the Eagle Mfg. Company because of the added lines and broader scope of manufacture. The company will continue to make dies, stamps and special tools, and is now manufacturing water motors also. The approximate cost of the new plant will be $50,000. Some new tools will be needed. The officers are R. B. Goodrich, president; Henry Vogel, vice-president, and Roger Morrison, secretary and treasurer.

Work of reorganization and the carrying out of improvements and changes made possible through the increase of capital stock by the Sebastian Lathe Company is progressing under President Benjamin Sebastian and will be concluded on the return of Superintendent Jacob May. President Sebastian reports business excellent, although a full time schedule with a full force has been maintained during the past two years. The company's specialty is a 15-in. lathe.

Considerable interest is shown at this time over the matter of prices on certain tools. These do not include the planers, radial drills and some other heavy types. A 10 per cent. increase is likely to be asked on the lighter tools, such as lathes, upright drills, shapers and millers—machines that enter largely into automobile construction. It is reported that two of the largest milling machine manufacturers in the country are already agreed on this raise, although not openly announcing it as yet. The demand for skilled machinists from the automobile manufacturing concerns has not only thinned the ranks of toolmakers' helpers, but by paying fancy prices of from 25 to 40 cents and over per hour established a partial precedent which as a heritage to the tool manufacturing industry is soon to have an impress on prices of the finished product. Manufacturers are already taking a deep interest in the coming convention on October 12, in New York, of the National Tool Builders' Association, and there will be a large delegation from this section. The subject of prices and costs will be chief topics of discussion. As a forerunner of what is expected

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in the matter of prices, one local manufacturer has notified all agents that prices on future stock orders will be subject to the prices quoted on that product at time deliveries are made.

A new company known as the Union Sheet & Tin Plate Company has been organized at Marietta, Ohio, with a capital stock of $800,000, to operate the steel mill in that city built some five years ago and which has been practically idle ever since. The mill was built originally to operate in connection with the mills at Byesville and Newcomerstown, Ohio. It was sold at public sale two years ago. The officers of the new company are W. D. Park, Asbury Park, N. J., president; P. F. Hogan, New York, vice-president; F. M. Stephenson, Pittsburgh, treasurer; W. C. Park, Asbury Park, N. J., auditor, and George I. Stanford, Milford, Conn., general manager.

## Milwaukee Machinery Market.

MILWAUKEE, WIS., September 21, 1909.

While Milwaukee has, for some years past, been regarded as a center for the manufacture of automobile parts and accessories, the extent to which this industry has developed here within a few months is positively bewildering. Not only are the regular plants, such as the A. O. Smith Company, operating to their full capacity, but several of the larger machinery builders, having been caught in the whirl, are taking on various details of this work as a side line, and numerous small shops have gone over to it altogether. Particularly profitable orders are being received by concerns which had the foresight to provide modern machinery equipment for turning out automobile parts and accessories quickly, with a minimum of labor. Speed in delivery forms the primary consideration, and there is no haggling over price; but the motor car manufacturers are particular to place contracts only with shops that can show their ability to fulfill them to the letter. Such shops now utilize every square foot of available floor space and are installing new tools, in either permanent or temporary additions, as fast as these can be provided.

Small concerns, composed of two or three master mechanics in partnership, with a few hired machinists and apprentices, are also springing up; and so strong is the demand for light manufacturing space of relatively inexpensive character that a decadent district here in which numerous small shops and factory buildings had for years stood vacant, or been relegated to other purposes, is showing new industrial life. These small firms have started mostly with second-hand tools and crude equipment; but before another year passes there will be a very considerable demand from this source for new machinery.

Specializing in the manufacture of one or a few parts required in automobile construction has become the rule, and the result is to create a lively interest on the part of local manufacturers in any new machinery designed particularly for these separate lines. Automatic tools, a number of which can be tended by a single operative, are especially desired.

The machinery trade in general shows distinct gains from one week to another. One very strong indication of this is the fact that a great deal of low priced or otherwise undesirable work, which was formerly accepted as a filler, now goes begging. Prices are stiffening all along the line, and competition has become very much milder. For immediate or 30 days delivery a good premium can ordinarily be obtained, but the opportunities for buying on that basis are becoming scarcer every day and the product of many shops is completely sold for four to eight months ahead. It is reported that Henry Tiedemann, who recently organized the Menominee (Wis.) Tool Company, will start for Europe about October 1, to buy the special equipment needed for his new factory, the inference being that he is not able to obtain in this country, for reasonably prompt delivery, what he requires. Similar purchases have been made abroad this year by Wisconsin manufacturers, but, so far as can be learned, they covered only single tools of a highly special, patented character, and Mr. Tiedemann's reported decision marks a distinct departure for this section.

A traveling crane of moderate capacity, hand or electric, will be required by the Sailor-Whitmore Company, Menasha, Wis., for its new foundry.

Structural steel bids will be taken by the Menasha Paper Company, Menasha, Wis., for the second new mill to be erected this season, which is located at Ashland. Power and electrical machinery, shafting and special mill equipment will be purchased later.

Considerable machinery, including possibly a new boiler and engine plant, generator, motors, &c., will be bought within a few months by the Kaukauna Lumber & Mfg. Company, which has had plans prepared for a large extension to its works at Kaukauna, Wis.

A five-story building for light manufacturing, with the machinery incidental thereto, will be erected in Milwaukee by Geo. Seelman.

The Federal Steel Specialty Company, which was recently organized here for the manufacture of a varied line of products, including seamless steel tanks and reservoirs, has acquired the old cement works near Fox Point and is equipping them with modern machinery.

In connection with the new incineration plant under construction here, plans are being made for converting the heat into steam power. This will involve the purchase of boilers, engines and electric generators.

New machinery will be installed by W. C. Russell & Co., Beaver Dam, Wis., whose factory recently burned, in the gas company's old plant, and operations resumed there until suitable works can be provided.

The Manitowoc Dry Dock Company, Manitowoc, Wis., which now takes contracts for building steel vessels, has increased its capital stock to $350,000.

Furnace, boiler, engine, electric motors, sawing machinery, blowers, &c., will be required for the new hardwood flooring factory of the J. W. Wells Company, Menominee, Mich., which is to be erected this fall.

The Appleton Wire Works Company, Appleton, Wis., is having plans prepared for a 120-ft. extension to its plant, two stories, of reinforced steel construction. New machines will be added.

The American Skein & Foundry Company, Racine, Wis., has had plans prepared for a new office building and will probably start work this winter on a large addition to the plant.

## Government Purchases.

WASHINGTON, D. C., September 21, 1909.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until October 5 for eight marine water tube boilers for the Philadelphia Navy Yard, eight marine water tube boilers for the Norfolk Navy Yard, four No. 0 milling machines, two No. 2 milling machines and three 20-in. belt driven shapers for the Newport Navy Yard.

The Isthmian Canal Commission will receive bids until September 28, Circular No. 537A, for locomotive coaling cranes, motors and other supplies.

The following bids were opened September 9, Circular No. 531, for machinery for the Isthmian Canal Commission:

Class 1.—One screw cutting engine lathe—Bidder 32, Fairbanks Company, New York, $404.50; 33, Frevert Machinery Company, New York, $416; 35, Garvin Machine Company, New York, $425 and $450; 51, Manning, Maxwell & Moore, New York, $500; 63, Niles-Bement-Pond Company, New York, $435; 96, Fox Brothers & Co., New York, $411.72.

Class 2.—One punching and shearing machine—Bidder 10, Bethlehem Steel Company, South Bethlehem, Pa., $3240; 16, Buffalo Forge Company, Buffalo, N. Y., $1748; 51, Manning, Maxwell & Moore, New York, $2580; 58, New Doty Mfg. Company, Janesville, Wis., $2970; 63, Niles-Bement-Pond Company, New York, $2875; 68, Henry Pels & Co., New York, $3175; 76, William Sellers & Co., Philadelphia, Pa., $4485; 88, Williams, White & Co., Moline, Ill., $2150; 93, Cleveland Punch & Shear Works, Cleveland, Ohio, $2085; 94, Covington Machine Company, Covington, Va., $2225 and $2345; 71, Queen City Punch & Shear Company, Cincinnati, Ohio, $2460; 102, Wickes Brothers, Saginaw, Mich., $3067.75.

Class 3.—One extension vertical, boring and turning mill—Bidder 51, Manning, Maxwell & Moore, New York, $7418, $7318 and $6505; 63, Niles-Bement-Pond Company, New York, $6483; 76, William Sellers & Co., Philadelphia, Pa., $6580.

Class 4.—Six bilge pumps, six hand pumps and six cistern pumps, has been awarded to Vermilye & Power, New York, at $67.80.

The following bids were opened September 7 for machinery for the navy yards:

Class 71.—One double end combination punching and shearing machine—Bidder 20, Bethlehem Steel Company, South Bethlehem, Pa., $6185; 79, Hilles & Jones Company, Wilmington, Del., $4418; 137, New Doty Mfg. Company, Janesville, Wis., $4000; 201, Covington Machine Company, Covington, Va., $4938.

Class 81.—One surface condenser—Bidder 1, Alberger Condenser Company, New York, 8874; 14, Blake & Knowles Steam Pump Works, New York, $1320 and $1125; 49, M. T. Davidson Company, Brooklyn, N. Y., $1210; 50, Drew Machinery Agency, Manchester, N. H., $762.50; 187, C. H. Wheeler Mfg. Company, Philadelphia, Pa., $725; 193, Wheeler Condenser & Engineering Company, Carteret, N. J., $870; 195, Warren Steam Pump Company, New York, $811.

The following bids were opened on August 19, at the office of the engineer of the twelfth lighthouse district at San Francisco, Cal., for two horizontal gasoline engines and two 10 x 10 in. compressors for the Point Sur light station, Cal.:

George E. Daw Pumping Engine Company, San Francisco, Cal., Doak 18-hp., $2256, accepted; Western 18-hp., $2484; Field 20-hp., $2531.

Harron, Rickard & McCone, San Francisco, Cal., Foos 20-hp., Ingersoll-Rand, $2500.

Joshua Hendy Iron Works, San Francisco, Cal., Doak 18-hp., Garnder, $2598.

Henshaw, Bulkley & Co., San Francisco, Cal., Field 20-hp., $2700; Western Gas Engine Company, San Francisco, Cal., 18-hp., $2599; Giant, $2528; Bury, $2528; Ingersoll-Rand, $2903.

Nevada Machinery & Supply Company, San Francisco, Cal., Alarm 18-hp., $2800.

The Westinghouse Machine Company, Pittsburgh, Pa., has been awarded contract for one 1000 kw. and two 1500 kw. turbo alternators for the New York, Philadelphia and Boston navy yards at $64,750.

# HARDWARE

THE warning recently uttered by James J. Hill in regard to the food supply of the country, because of the failure of the wheat crop to keep pace with the growth of consumption, has commanded wide attention and apparently made a deep impression. The danger is recognized that if the present trend of things continues a shortage in the great food supply is imminent, so that we may have to reckon with importations instead of sending wheat abroad. While it is well to have our attention thus forcibly directed to this matter, it should be remembered that there are considerations on the other side, so that it is not necessary to take a depressing view of the situation. Many States have within a few years increased their wheat acreage, and the statistics indicate that the average yield of wheat per acre is now considerably larger than a few years ago, and in some States this increase has been quite marked. It is, however, doubtless a fact that agriculture is backward in the use of approved methods and that rotation of crops and the most approved methods of cultivation would do much to increase the yield. The trouble seems to be that in some sections it is so easy for the farmers to make money that they are not stimulated as they would be if they were obliged to resort to the best methods; while in other cases it is so hard for them to make good that they abandon farming and flock to the cities.

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The problem in regard to agriculture and the drift to the cities, and the consequent abandonment of farms and the scarcity in some sections of labor, is a difficult and complicated one. It is easy to theorize about it and suggest remedies, but to correct existing defects and check the tendency toward urban life is not an easy matter. The discussion of it is, however, altogether desirable. The main hope, however, must be in the operation of natural laws, which will in the long run accomplish more than organized effort. The scarcity of wheat, for example, may develop higher prices than we are wont to pay. These high prices will tend immediately to increase the acreage. The impoverishment of the soil will be a potent factor in compelling the adoption of wiser agricultural methods. Thus in course of time there will be a gradual checking of the present trend and the production of whatever wheat is needed. The question is, in the last analysis, as much a commercial as an agricultural one.

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The merchants of the country are, perhaps, too apt to consider public questions and especially public expenditures in the light of their own immediate interests only, instead of taking the broadest view and exerting their influence in the direction which will, all things considered, conduce to the general welfare, of which in due course they would enjoy their share. This agricultural problem is, however, one in which the commercial classes are both directly and indirectly interested. Many merchants throughout the country are immediately dependent in large measure upon the farming class, and anything which concerns the welfare of the farmers becomes an element in the business problem of the merchants. If anything can be done by those in the towns who have dealings with those residing in the country to stimulate or educate them in the direction of better methods and broader views it would be good policy to make the effort. It is, however, questionable how much can be accomplished in this way. The farmers are not disposed to look to towns-folk for their instruction. The commercial class, however, can use its great influence in promoting the efforts which are being made by the general Government and by the States for the improvement of agriculture—the establishment of modern farms, the dissemination of literature, and similar public spirited movements, the success of which will contribute to the prosperity of all classes.

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A good deal of the trouble comes from the fact that the farmers are not cultivating the ground with sufficient care and skill to get out of it as much as it is capable of yielding. On the one hand may be seen poor methods of cultivation, causing the land to yield one-half or two-thirds of what might be produced from it; while on the other hand there are abandoned farms or untilled ground which might be put under the beneficent sway of the plow. In this condition the merchants who deplore the neglected opportunities of the farmer might find an illustration of their own shortcomings. Many a merchant is easy going in the cultivation of the commercial field. He takes care of the trade that comes to him without much effort on his part. He does little to attract trade. He might sell more goods and more profitable goods. Business in his territory is often permitted to go elsewhere. With better methods and more enterprise and initiative on wise lines he would make the ground yield larger returns. After all, his own lack of skill and energy is to him a more serious matter than any deficiencies of the farmers or a prospective shortage in the wheat crop.

## Condition of Trade.

The general commercial situation is very satisfactory, as progress is steadily making in the direction of increased business. With this there is a decidedly confident tone in the market, and anticipations of good trade in the near future are freely expressed. There is thus a perceptibly improved feeling which promises well. In Hardware and related lines this condition of things prevails, stimulated by the advances which recently have taken place in the iron market and the indications of better business with the railroads. The rapidly diminishing number of idle cars is evidence of the enlarged movement of merchandise, while the larger aggregate of bank clearings and their increased amount in nearly all centers as compared with 1908 are significant of the financial side of the improved conditions. In the Hardware field many manufacturers report a fair volume of business, but while they join in the general recognition of improvement and are hopeful of the future they refer also to the moderate volume of purchases at this time. The tone of the market is, however, cheerful and strong, and advances are being announced in a good many lines, especially in the department of Heavy Hardware. This is all very well from the standpoint of the seller, but there is another side to the matter.

This is shown in a letter from a Hardware merchant of recognized position, who protests against the general

tone of utterances by manufacturers and jobbers who are "commencing their everlasting talk of shortages and advanced prices to take place at once or soon." In the opinion of our correspondent, such talk, indulged in apparently for the sake of booking orders, is unwise, inasmuch as retail merchants have had a hard time during the past two years, and now that business is beginning to open up should not be confronted by an advance with an intimation that unless they buy promptly and liberally they will have to go without goods. There is doubtless force in this contention, for there is little question that the representatives of some jobbing houses and possibly of some manufacturers are overstating the improvement in the market and overestimating the demands which are likely to be made on the productive capacity of the country. There is unquestionably a stronger tone in the market, and a reaction from the extreme low prices which have ruled in some lines and reflected in the advances which have taken place especially in heavy goods. In some few lines it is not improbable that there will be a scarcity for the time, but it is to be hoped that the makers and wholesale distributors of goods will refrain from making radical advances, except where they are really necessary, recognizing the evils which are attendant on high prices. It will contribute to the promptness of good business conditions if prices are kept on a moderate level, and it is especially unwise for those who have goods to sell to urge merchants to purchase beyond their needs because of the probability of higher prices. This speculative element should be kept out of business as much as possible. It is a dangerous game in which in the long run more is lost than gained.

### Chicago.

In reviewing market developments of the past week in the Hardware trade, the most reassuring feature noted is the universal feeling of confidence that exists in the elemental soundness and security of conditions underlying industrial and commercial movements. If business is not increasing as rapidly as might be desired in some lines and buyers in others are slow in coming forward for seasonable goods, no uneasiness is felt on this account in any quarter; for the belief prevails that the momentum gained will be maintained by the forces which created it. The retail dealers generally are not yet buying as liberally as it is believed they will a little later when the crops are all taken care of, fall seeding concluded and the agricultural demand for Fencing and material for building improvements is in full swing. In view of the fact that farmers have ample means at their command to make such improvements on an unstinted scale, it is not at all likely that their expenditures for this purpose will be meager or ultraconservative. Just now it is the manufacturing industries that are buying most freely, and shipments on this account are heavy. Delays in the delivery of Sheets, both Black and Galvanized, are becoming more extended and prices are decidedly firmer. Shops that ordinarily buy direct from the mills are having to depend more and more upon jobbers' stocks for prompt requirements, and this, of course, contributes not a little to the strength of the market. Recent advances in pig iron and melting scrap has imparted a stiffer tone and in some cases has resulted in higher prices on Cast Iron goods, especially those of the rougher and less finished sorts. Sash Weight values, for instance, are no longer characterized by unsteadiness, but are firmly held at a level $3 or more a ton above that prevailing some weeks ago. With prices of rolling mill products also gradually moving in ascending scale, there is not much room for recession in the long list of more or less highly finished articles of Hardware made from such material. The outlook for continued activity in building is most flattering. Besides the work now in progress, much more is in prospect, all of which foreshadows heavier demands upon the makers of Builders' Hardware.

## NOTES ON PRICES.

**Wire Nails.**—The Wire Nail market is in an eminently satisfactory condition, without special development during the past week. While new business is not very heavy, in view of the large purchases made when prices were lower, there is still a wholesome movement and many new orders are being placed, keeping the mills well occupied. The manufacturing and selling departments may thus be described as in a state of equilibrium, the calls for shipments just keeping pace with the production. It is seldom that there is as little complaint of irregularity in prices. What little there is is caused by concessions made by jobbing houses giving their customers the benefit of the low figures at which their stocks were purchased. Quotations are as follows, f.o.m. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

| | |
|---|---|
| Carloads to jobbers | $1.80 |
| Carload lots to retail merchants | 1.85 |
| Less than carloads to jobbers | 1.85 |
| Less than carloads to retail merchants | 1.95 |

*New York.*—The demand for Wire Nails is only moderate, but is increasing. Orders are for such quantities as merchants need at the present time and to cover prospective requirements of the near future. The general quotation is $2 per keg for small lots from store.

*Chicago.*—Having disposed of the earlier low priced orders placed immediately after the drastic reduction last May when the price was dropped to $1.60 a keg, the leading mills are forwarding heavy shipments against contracts placed later at an advance of $2 a ton. While some new business is being booked at the present price of $1.80 a keg, buying on this basis cannot yet be said to have become general. The Southern trade, which has been especially slow in developing, is improving in some sections and conditions generally favor the expectation of a satisfactory trade through the later fall months. Coupled with excellent conditions surrounding agricultural interests is the growing activity in manufacturing lines, all of which points to larger consumption of Wire Nails. Prices are reported firm at the following quotations: $1.98, Chicago, in carloads to jobbers, and $2.03 in carloads to retailers, with an advance of 5 cents for less than carloads from mills.

*Pittsburgh.*—New orders being placed for Wire Nails are light, and mostly in small lots, consumers having covered their requirements for 60 days ahead or longer, prior to the last advance in prices from $1.70 to $1.80 per keg. It is stated that the mills have cleaned up all the business taken at the $1.60 price, and that practically all the contracts now on their books, against which buyers are specifying freely, are at the $1.70 price. It is believed new demand for Wire Nails will show a steady increase from this time forward, and that business will be heavy as soon as present contracts are cleaned up. Shipments by the mills are heavy, and the two local plants of the American Steel & Wire Company at Braddock and Rankin and the large Wire Nail mills of the Pittsburgh Steel Company at Monessen, are being operated to fullest capacity. We are advised the market is very firm, and we quote Wire Nails at $1.80, base, f.o.b. Pittsburgh, in carload and larger lots.

**Cut Nails.**—With the progress of the season and the increase in the volume of general business more orders are going into the mills for Cut Nails, and the market has a steady and almost strong tone. The mills are well occupied on orders placed some time ago, and in shipping goods required at once. The market is represented by the quotation of from $1.75 to $1.80, f.o.b. mill, and has rather a strong undertone in view of the increased cost of raw material.

*New York.*—There is little new to report in regard to the Cut Nail market here. Quotations are pretty evenly maintained at about $2 per keg, base, at store. Some improvement in the volume of business is reported.

*Chicago.*—The demand for Cut Nails is gradually increasing, and orders of fair volume are being entered by the mills. Advancing values in iron and steel materials

together with more liberal buying have operated to stiffen prices which are more firmly held than for some time. We quote as the minimum, above which 5 cents a keg is asked by some mills, as follows: In car lots to jobbers, Steel Cut Nails, $1.93; Iron Cut Nails, $2.03.

*Pittsburgh.*—New demand is fairly active, but is mostly in small lots, consumers having placed contracts some time ago when prices were lower and against which they are now specifying freely. We quote Cut Nails at $1.75, at mill, which is regarded as minimum of the market, while some of the Eastern mills are quoting on the basis of $1.80, f.o.b. mill. It is stated that with the continued advances in prices of steel, higher figures for Cut Nails in the near future are imperative.

**Barb Wire.**—During the past week there has been some improvement in the demand made upon the mills for Barb Wire, but the volume of business is not especially heavy. The mills are, however, well occupied in executing orders placed some time ago, and with prices quite evenly maintained there is little cause for complaint. Quotations are as follows, f.o.b. Pittsburgh:

| | Painted. | Gal. |
|---|---|---|
| Jobbers, carload lots | $1.80 | $2.10 |
| Retailers, carload lots | 1.85 | 2.15 |
| Retailers, less than carload lots | 1.95 | 2.25 |

*Chicago.*—The mills are chiefly engaged in cleaning up old contracts against which specifications are still being placed. Some new orders are being entered, but not in such volume as would indicate a general movement in buying for the fall season. All reports concerning future trade prospects are favorable to the development of a heavy demand when the season is fully opened. The market is said to be firmly maintained at the following quotations: To jobbers, Chicago, carloads, Painted, $1.98; Galvanized, $2.28. To retailers, carloads, Painted, $2.08; Galvanized, $2.38; retailers, less than carloads, Painted, $2.13; Galvanized, $2.43. Staples, Bright, in carloads, $1.98; Galvanized, $2.28; carloads, to retailers, 10 cents extra, with an additional 5 cents for less than carloads.

*Pittsburgh.*—New demand is light and has not improved as the mills thought it would, particularly from the Southern markets. It is still believed that fall demand will be heavy, but it is late in developing. There still remain some contracts on the books of the mills against which buyers are specifying, and on which shipments are going forward. It is stated that regular prices are being maintained, and we quote Galvanized Barb Wire at $2.10 and Painted at $1.80 in carload and larger lots, f.o.b. Pittsburgh, subject to usual terms.

**Fence Wire.**—There is a good degree of activity in the Fence Wire market, the mills being well occupied in shipping on contracts made some time ago or urgent orders of recent date. The manufacturers of Fencing are in a good many cases asking for prompt shipments. Prices are evenly maintained, and the market is thus in excellent condition. Quotations to jobbers in carload lots are as follows, on a basis of $1.60 for Plain and $1.90 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the usual price to retailers being 5 cents additional:

| Nos. | 0 to 9 | 10 | 11 | 12 & 12½ | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|
| Annealed | $1.60 | 1.65 | 1.70 | 1.75 | 1.85 | 1.95 | 2.05 | 2.15 |
| Galvanized | 1.90 | 1.95 | 2.00 | 2.05 | 2.15 | 2.25 | 2.65 | 2.75 |

*Chicago.*—In addition to a fair amount of new business, buyers are specifying freely against uncompleted contracts. Fence manufacturers are urgent in their requests for prompt shipments, which in some cases are not coming in as fast as desired. A satisfactory trade is expected, and a livelier movement is looked for as the time for active operations in fence building approaches. We quote as follows: Carloads, to jobbers, $1.78, base, f.o.b. Chicago.

*Pittsburgh.*—The mills are running mostly on specifications against contracts placed by consumers prior to the recent advance in prices. Consumers are urging the mills for prompt shipments, and a material increase in new demand is expected when fall trade opens up, which it is expected to do very soon. Prices are firm, and we quote Galvanized Wire at $1.90 and Painted Wire at $1.60 in carload and larger lots f.o.b. Pittsburgh, subject to 2 per cent. discount for cash in 10 days.

**Rubber Goods.**—Prices of Rubber Goods of all kinds have been unsettled for more than a year past on account of unusual conditions in the market for crude Rubber. Manufacturers have made quotations subject to change without notice, a condition not always acceptable to dealers, but one for which the manufacturers are not responsible. In July the makers of Rubber Tires, only a few in number, advanced prices, in view of the increased cost of the raw material, 15 per cent. or more. This advance has been maintained very firmly, in spite of the fact that Tires made previously may still be picked up at prices based upon previous conditions. The manufacturers of other lines of Rubber Goods, made by a greater number of firms, under more widely varying conditions, have continued to market their products at a range between prices prevailing formerly and a level indicated by the advance made by the automobile manufacturers.

EFFECT OF THE FINANCIAL DEPRESSION.—It is to be kept in mind that the recent financial depression led to a reduced demand for manufactured goods of all kinds, including manufactures of Rubber. The production of crude Rubber proceeding at a fairly regular rate, stocks of this material accumulated, so that early in 1908 abnormally low prices were registered, in consequence of which some makers of Rubber Goods reduced their prices materially. The first resumption of business activity, however, was followed by an increased demand for Rubber Goods, resulting in a rapid decrease of accumulated stocks of crude Rubber.

STEADY ADVANCE IN PRICES.—This increase was followed by a steady advance in the cost of crude Rubber, which would have been natural under any circumstances, but was augmented by an unprecedented increase in the automobile industry. For example, the earlier estimates for the 1910 production of automobiles was only one-third of what is now admitted to be the probable demand—some 200,000 vehicles. The Tire manufacturers, therefore, entered the crude Rubber market actively, with the result that about August 1 the highest prices on record for Rubber were paid. Prime grades of Rubber brought $2 per pound—$4000 per ton—compared with the then supposed abnormally low price of 95 cents a pound—$1900 a ton—a year previously. While there have been fluctuations since August 1, New York prices for crude show an upward tendency, having advanced with a week, so that the recent price of $1.95 is superseded by the higher quotation of $2 to $2.10, which now represents the market.

HIGHER LEVEL.—Rubber manufacturers, as a rule, carry stocks to keep them going for two or three months, and the cost of Rubber Goods in store to-day does not always hold a close relation to current quotations for raw material. But as a general proposition it may be stated that the best authorities are agreed that for a considerable time to come the cost of raw material is liable to continue at a higher level than was ever known before the present year. At the same time it is worth mentioning that one important concern was able, during the period of the deepest depression, to buy a large quantity of Rubber—stated at 200 tons—at a lower price than has been quoted publicly for 10 years. This is an isolated instance, however, and the lucky firm is not known to have offered its products at a lower price than competitors, who have been forced to buy in the open market for Rubber, are charging.

WIDE RANGE OF QUALITY.—The point to be kept foremost in relation to Rubber Goods is that prices must be based upon risks unusual in most lines carried by Hardwaremen, and that with the raw material at $4000 a ton the dealer or consumer assumes risks in buying low-priced goods, since no other industry offers a possibility of so wide a range in the quality of products.

**Stove and Tire Bolts.**—The market for Stove and Tire Bolts is strong, and there are indications in the trade of an expected advance next month of about 10 per cent.

**Steel and Iron Squares.**—The manufacturers of Steel and Iron Squares have agreed on a new list, effective September 15, all quotations previously made having been withdrawn. These lists represent the following makers—viz.: Russell & Erwin Mfg. Company, Nicholls Mfg. Company, Peck, Stow & Wilcox Company, Southington Hardware Company, Sargent & Co. and the Eagle Square Company:

## COMPARATIVE LIST OF POLISHED STEEL SQUARES

| N. Mfg. Co. | S. & Co. | P., S. & W. Co. S. Hdwe. Co. | R. & F. Mfg. Co. | E. Sq. Mfg. Co. Nos. | Per doz. |
|---|---|---|---|---|---|
| 100 | 100 | 100 | 100 | 100 | $19.00 |
| 1 | 1 | 1 | 1 | 1 | 18.00 |
| 2 | 2 | 2 | 2 | 2 | 16.50 |
| ---- | 2½ | 2½ | 2½ | 2½ | 16.50 |
| 3 | 3 | 3 | 3 | 3 | 15.00 |
| 4 | 4 | 4 | 4 | 4 | 15.00 |
| 5 | 5 | 5 | 5 | 5 | 14.25 |
| | 6 | 6 | 6 | 6 | 13.50 |
| | 7 | 7 | 7 | 7 | 12.75 |
| | 8 | 8 | 8 | 8 | 12.05 |
| | 9 | 9 | 9 | 9 | 12.00 |
| 10 | 10 | 10 | 10 | 10 | 9.75 |
| | 11 | 11 | 11 | 11 | 9.30 |
| 12 | 12 | 12 | 12 | 12 | 11.25 |
| 13 | 13 | 13 | 13 | 13 | 12.50 |
| 14 | 14 | 14 | 14 | 14 | 12.75 |
| | 15 | ---- | 15 | 15 | 144.00 |
| | 16 | ---- | ---- | 16 | 36.00 |
| | 17 | ---- | ---- | 17 | 51.00 |
| | ---- | 20 | ---- | ---- | 6.75 |
| | 52 | ---- | ---- | ---- | 12.00 |
| | 30 | ---- | 30* | ---- | 12.75 |
| | 40 | ---- | ---- | --- | 7.20 |
| | 41 | ---- | ---- | ---- | 6.75 |
| | 44 | ---- | ---- | ---- | 12.00 |
| | ---- | 31 | ---- | 31 | 6.00 |
| 32 | ---- | 32 | ---- | 32 | 6.75 |
| 34 | ---- | 34† | 34 | 34 | 12.00 |
| | 100R | ---- | 100R* | 100R | 21.50 |
| | ---- | ---- | 300 | ---- | |
| | 314 | ---- | 314 | ---- | 17.00 |
| | 1R | ---- | ---- | 1R | 20.00 |
| | 3R | ---- | ---- | 3R | 17.00 |
| | ---- | ---- | ---- | 5R | 8.00 |
| | ---- | ---- | ---- | 14R | 87.00 |
| | 322 | ---- | ---- | ---- | 6.30 |

* R. & F. Mfg. Co., No. 300 Polished ..... $19.50
R. & F. Mfg. Co., No. 100R, Polished ..... 27.30
† P. S. & W. Co., No. 34, Polished, ..... 8.25

## IRON SQUARES

| | | |
|---|---|---|
| 1 and 21 | $5.25 | P., S. & W. Co., E. Sq. Mfg. Co. and |
| 2 and 22 | 6.00 | R. & F. Mfg. Co. use Nos. 1, 2 and 4, and S. & Co. |
| 4 and 24 | 7.50 | and N. Mfg. Co. Nos. 21, 22 and 24. |

The regular printed discount is 50 per cent., but orders for fair quantities may be placed at 60 per cent. discount from list.

There is also a schedule of additions for special finishes, as here given from which there are only slight concessions in quantities.

## ADDITIONS FOR SPECIAL FINISHES.

| | | |
|---|---|---|
| NICKEL PLATE, ELECTRO COPPER on STEEL, PLAIN GALVANIZED, | 12 inch and smaller, add to the Price of Polished...Net, per dozen. | $1.80 |
| | Larger than 12 inches, add to the Price of Polished...Net, per dozen. | 2.50 |
| BLUED, GUN METAL GALVANIZED, NICKEL PLATED and ELECTRO COPPER on STEEL with COLORED MARKINGS, | 12 inch and smaller, add to the Price of Polished...Net, per dozen. | 2.50 |
| | Larger than 12 inches, add to the Price of Polished...Net, per dozen. | 3.00 |
| NICKEL PLATED on ELECTRO COPPER, | 12 inch and smaller, add to the Price of Polished...Net, per dozen. | 3.60 |
| | Larger than 12 inches, add to the Price of Polished...Net, per dozen. | 5.00 |
| NICKEL PLATED on ELECTRO COPPER with COLORED MARKINGS, | 12 inch and smaller, add to the Price of Polished...Net, per dozen. | 4.30 |
| | Larger than 12 inches, add to the Price of Polished...Net, per dozen. | 5.50 |

ROYAL COPPER—All sizes, add to the Price of Polished $6.00 Net, per dozen.

**Twist Drills.**—At a meeting in Boston, September 16, an advance of approximately 10 per cent. was made in standard lines of Straight and Taper Shank Twist Drills.

**Stanley Works.**—The Stanley Works, New Britain, Conn., has issued discount sheet, No. 17, dated September 20, covering the lines of goods in its catalogue of February, 1906. The reason given for the changes, which are all in the direction of higher prices, is because of increasing costs and an active demand. The principal advances are as follows: Plated Butts, Nos. 241 and 241½, 10 per cent.; a slight advance on No. 239 and Ball Bearing Butts; 10 per cent. on Strap and T Hinges; 10 per cent. on Barrel and Square Door Bolts; 15 per cent. on Shelf Brackets and Sash Lifts, and about 10 per cent. on various miscellaneous goods. Under present conditions all quotations are subject to change without notice. There is also being sent with it a four-page sheet giving tabulated net prices per 100 pairs of Wrought Steel Plated Butts, Japanned Butts, Wrought Steel Ball Bearing Butts, Wrought Steel Extra Heavy Plated Butts, Extra Heavy Ball Bearing Butts, Wrought Steel Ornamental Surface Door Butts, Wrought Bronze Metal Butts and Ball Bearing Bronze Metal Butts, regular and extra heavy.

**Bright Wire Goods.**—Bright Wire Goods were advanced 10 per cent. September 16, the market being represented by a quotation of 90 and 20 per cent. from the list, although for a time jobbers with lower priced goods on hand make concessions beyond these figures.

**Chisels and Drawing Knives.**—Prices on Chisels and Drawing Knives were reaffirmed on September 16.

**Cotton Duck.**—The recent advance in the prices of Cotton Duck is approximately to 32½ per cent. discount, instead of 40 per cent. discount, previously quoted.

**Steel Goods.**—The new prices on Steel Goods, recently issued, remain in general as for last season, with the exception of a 5 per cent. advance on Southern Hoes.

**Copper Wire.**—The price of round bare Copper Wire was, on September 16, reduced ½ cent per pound, to 14½ cents, on gauges 0000 to 8.

**Leather Belting.**—Leather Belting was advanced, September 17, an average of 10 per cent., these prices being coincident with a much stronger market.

**Stove Boards.**—The market for Stove Boards is extremely sensitive and jobbers in some sections are selling at prices below the manufacturers' prices. Business in this line is backward and evidently merchants do not intend to carry over stocks. Manufacturers assert that they are standing by their own quotations and that jobbers are quoting low prices on their own initiative.

**Window Glass.**—An advance of about 5 per cent. was made in the price of Window Glass under date of the 18th inst. The manufacturers declare that this advance barely covers the increase in wages and price of material. Another meeting of the manufacturers is scheduled for to-morrow, 23d inst., at Pittsburgh, to which the jobbers have been invited, and it is intimated as a possibility that a further advance may be determined upon. The American Window Glass Company is steadily replacing the men in its flattening and cutting departments who went on strike a short time since. In accordance with the advance above noted, prices recommended by the Eastern Window Glass Jobbers' Association, from jobbers' list, October 1, 1903, for territory east of the Alleghany Mountains, have been changed as follows: New England States, from jobbers, Single, 90 and 30 per cent., and Double, 90 and 35 per cent.; New York State, Single, 90 and 30 per cent., and Double, 90 and 35 per cent.; New York State, factory shipments, Single, 90 and 40 per cent.; Double, 90 and 45 per cent.; in the Southern States discounts vary from 90 and 20 to 90 and 30 per cent. on Single and from 90 and 25 to 90 and 40 per cent. on Double.

**Linseed Oil.**—The market continues on about the same lines as reported in our last issue. There is a fair degree of activity in the demand, and prices are largely on a basis of 56 cents for Western Raw in five-barrel lots and over. Boiled Oil is 1 cent advance per gallon on Raw.

**Spirits Turpentine.**—Buying during the week has been of a fairly liberal character, but limited to early requirements. The tone of the market in the matter of price is firm. The New York market is represented by the following quotations: Oil Barrels, 60 to 60½ cents; Machine Made Barrels, 60½ to 61 cents.

E. E. Maddox, Ord, Neb., has purchased the wholesale and retail Hardware business of Fatheree & Enfield Hardware Company, Artesia, N. M., handling Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements and Sporting Goods.

## Requests for Catalogues, Etc.

*The trade is given an opportunity in this column to request from manufacturers catalogues, price-lists, quotations, &c.*

**REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:**

FROM R. H. MORRIS HARDWARE COMPANY, Childress, Texas, whose store was partially destroyed by fire recently, the loss being fully covered by insurance. This company wholesales and retails Shelf Hardware, Stoves and Tinware, Sporting Goods, Queensware, Glassware, Windmills and Mill Supplies, and business has been resumed. A new front and metal ceiling are being put in and other improvements made.

FROM RICE & PETTY HARDWARE COMPANY, Campbell, Mo., which has been incorporated with a capital stock of $16,000, handling Shelf and Heavy Hardware, Stoves and Tinware, Housefurnishings, Agricultural Implements, Sporting Goods, Furniture, Harness, Buggies and Wagons.

FROM JOHNSTON HARDWARE COMPANY, which has engaged in business in Rome, Ga., carrying a wholesale and retail stock of Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Agricultural Implements, Sporting Goods, Tile, Mantels, Grates, Buggies and Wagons.

FROM HORNE HARDWARE COMPANY, which has purchased the business of G. A. Gove, Beverly, Mass., including Hardware, Paints, Oils, Cutlery and Sporting Goods.

FROM W. F. MILLARD, who has succeeded Millard & Le Fevre in the retail Hardware business in Newport, Wash., handling Shelf and Heavy Hardware, Stoves, Tinware, Paints and Oils.

Walter Goldsworthy has purchased an interest in the Hardware business of Martin Maumes, Pinconning, Mich. The firm will hereafter be known as Maumes & Goldsworthy.

## Underhill, Clinch & Co.'s New Location.

UNDERHILL, CLINCH & CO., 94-96 Chambers street, New York, wholesaling Hardware and related lines, have secured new quarters in the colony of Hardware houses which, during the past few years, have located in and about Centre and Lafayette streets, and between Leonard and Canal streets. The firm has leased for a long term of years the property at 84-86 White street, near Lafayette street. This step has been taken partly to acquire additional room for the business, which will give them almost double the space, and also to be in touch with the numerous Hardware houses who have located in this territory, more particularly within the past two years.

Underhill, Clinch & Co. were formerly on Beekman street, moving to their present address on Chambers street, 32 years ago. The negotiations for the property were consummated through the firm of De Selding Bros., 149 Broadway.

W. A. HENGSTENBERG, for many years connected with the Newhall Chain Forge & Iron Company of New York, and until recently vice-president of the company, has been appointed secretary and general manager of the Seneca Chain Company, Kent, Ohio. Mr. Hengstenberg will have full charge of the company's business, including the management of the plants at Kent and Mansfield, Ohio.

THE STEWART IRON WORKS COMPANY, Cincinnati, Ohio, in view of the large demand for its Iron Fence and other products, has found it necessary to make substantial additions to its extensive plant and warehouses. Considerable new machinery will be installed and employment given to many more men, so that a material increase in output may be effected.

# Standing Up for the Home Town.

OUR readers are more or less familiar with the elaborate system of form letters which the catalogue houses employ in canvassing for business throughout the country. According to the West Plains *Daily Quill*, West Plains, Mo., a physician of that town lately received a personal letter from one of the Chicago houses in which his patronage was solicited. This eloquent appeal concluded as follows:

> If there is any reason why you do not buy of us please give us your reasons in the enclosed stamped envelope and we will strive to remove the cause.

### Reasons Why He Doesn't Buy in Chicago.

The forcible reply of the physician, in which a loyal stand on behalf of the home town was taken, was as follows:

> Your letter asking why I had not traded with you for a long time received, and as you ask me to tell you frankly why, I will give you a few reasons:
>
> 1. I am in business in this community and am looking to this community with its varied industries for my support. I cannot ask the merchants of this town for their support if I do not give them mine.
>
> 2. In looking over my books I fail to find the names of either Mr. ——, Mr. ——, or any other of your company's officials, which reminds me that none of these gentlemen has ever given me a penny's patronage. Why is this? Am I too far away, or have neither of them needed a physician, or are they afraid of the mail order plan when it comes to the practice of medicine? I can certainly give as good satisfaction by mail as your house can, and will appreciate a call from either of them when in need of medical service.
>
> 3. In looking over the subscription lists for improving our streets and public highways, I have failed to find the name of any member of your firm down for one penny to assist in the work. Also, I have failed to find your name on any of the charity lists where help has been rendered to our poor; in other words, you are not down as a contributor to our Helping Hand Society. In fact, in all the movements for the betterment of our condition, where our community has needed the united efforts of her public spirited citizens, I have failed to find your name among the list of our contributing merchants. Your name is not on our city tax books, nor do I find where you have paid a city license to do a mercantile business in competition with our home merchants.
>
> These are a few answers to your questions, and I trust you will see the justice of them.

THOMAS R. VARICK, with his brother, Richard Varick, have acquired every share of stock in the John B. Varick Company, Manchester, N. H., and will also take over the real estate, the brothers becoming equal owners of all the property. The business originally started as Varick & Storm, later it became Varick & Adriance, then John B. Varick, and, finally, John B. Varick Company. The business will be expanded and pushed on even broader lines than ever. Since the death of John B. Varick in 1902 Thomas R. Varick has been the head of the corporation.

THE SIMONDS MFG. COMPANY, Fitchburg, Mass., has been awarded, we are advised, a grand prize on their Saws by the Alaska-Yukon-Pacific Exposition, Seattle. This is the highest award given. There was keen competition for the honor, which was awarded by a jury composed of men selected on account of their knowledge of general steel business and after tests of all Saws exhibited.

THE B. F. GOODRICH COMPANY, 66 Reade street, New York, manufacturer of Rubber Goods, is moving its entire business to its new building at 1780-1782 Broadway, corner of Fifty-seventh street.

Moore Bros. have bought out the retail Hardware business of E. C. Empfield, Anselmo, Neb., handling Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings and similar goods.

**This department is open for the discussion of questions which arise in the practical conduct of the Hardware business. Our readers are invited to contribute, submitting inquiries or answering questions.**

**Correspondents are expected to give their names and addresses, but in order to encourage frank expressions of opinion the advice of our correspondents will be treated in confidence, names and addresses not being published.**

**For convenience, Questions or Answers should be addressed to THE IRON AGE QUESTION BOX, 14-16 PARK PLACE, NEW YORK.**

## Automobiles and Automobile Accessories.

The merchant whose letter is given below agrees with most of our correspondents that the handling of automobiles by Hardware merchants is not feasible. Our correspondent, however, emphasizes the desirability of taking up energetically the sale of the supplies and accessories, which are regarded as a profitable line.

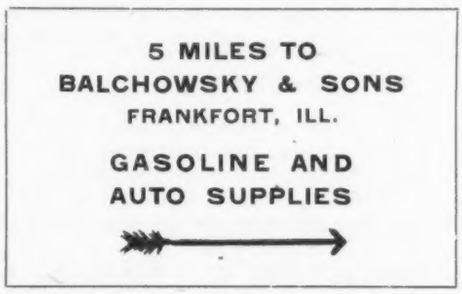
FROM ILLINOIS: Relative to Automobile and Accessories in connection with Hardware stocks, there is no doubt but that the carrying of accessories will be a natural outcome to be found in all up-to-date Hardware stores, but as to the Automobiles themselves, we say NO. And decidedly so, for after a car is sold your troubles, so far as loss of time is concerned, just begins.

**Loss of Tim .**

While not handling Automobiles, I can picture the loss of time (thereby loss of trade), unless you have a garage that attends to that alone, by my own experience of owning cars the last five years. When you sell a car and the party has trouble you would have to go out and fix it up even though by ordinary conditions you would have no reason to do so, and to be paid for such a trifle, hardly.

**A Separate Business.**

Automobiles are a separate business entirely, in our opinion, but what can be done, as we have done, is to erect signs like this




which will do a good work and the information given is appreciated by the traveler.

## Turning Stock.

The interesting letter which follows comes from a prominent merchant of many years' experience. It touches on the subject of turning stock and incidentally makes some general reflections.

FROM PENNSYLVANIA: This matter of turning stock depends altogether on the amount of capital and the management. If it were possible to turn stock three times without demoralizing prices it would be satisfactory. However, under ordinary conditions a $20,000 stock should certainly be turned during the year at least two and one-half times to show satisfactory results. Net results, however, depend upon the commanding officer and the members of his staff working in harmony. First of all find out what the expenses are (and in these days to do an up-to-date business in a town of any size means a larger expense account than it ever did before). Get this amount in dollars and cents. Then figure what your gross sales will be, if you are able to turn the stock, say, two and one-half times; *then what per cent. of these gross sales are your expenses,* and the result will be the average per cent. you must get on your sales before you show a profit and make money. If you are not making money, then you must turn your stock oftener by doing more business, for your competitors will most likely see to it that you do not increase the margin of your profit without grave danger to the business.

**Harmony of Commander and Staff.**

Many persons have an idea that the Hardware business can be managed by almost any one and make money. As a matter of fact, conditions are much the same in commercial life, professional life, in the army, navy, press, pulpit or bar. Success is only attained by being able to demonstrate your ability to make good, and you cannot make good without hard work, and that work must be done with enthusiasm and system. The larger your stock is and the better you manage it the more business you are able to concentrate, that would otherwise go to some other dealer or, possibly, to some other territory. In a business of any magnitude, if you do not have a good working force to assist you, you cannot make headway. If you have among your employees any who are not industrious, self-respecting and honest, then try and exchange them for those who have these essential requirements. I am convinced, after an experience of almost one-half century, that the average Hardwareman who makes a success of the business as his life work works harder than the merchant of almost any other line of trade.

**Attaining Success.**

A VERY COMPLETE and attractive Hardware catalogue has just been issued by the Stebbins Hardware Company, Chicago. It is a cloth covered book, 6 x 9 in., 353 pages, and is designated as general catalogue No. 20. While not intended to embrace all of the different kinds of goods that are kept and sold by Hardware stores, it has been compiled with a view to covering the essential lines in a practical way. Particular attention is given to Carpenter's and Wood Working Tools, and in this connection it is stated that the company handles no goods which the maker is ashamed to brand with his name. Besides the commoner articles of Hardware there is shown a complete line of Cement Tools, Contractors' Tools, Brushes, Trucks, Plumbers' and Linemen's Tools; also a very complete line of Cutlery. The last 37 pages are devoted to Locks and Builders' Hardware. The book is neatly arranged and profusely illustrated.

A FEW DAYS SINCE a well-known New England retail Hardware house was robbed, the stolen booty including three Colt's Automatic Revolvers, 25 caliber, No. 13,901; 32 caliber, No. 86,507, and 38 caliber, No. 22,324, as well as one Colt's Police Positive 38 caliber, No. 29,020. Other goods taken were two 38 caliber Iver-Johnson Revolvers, one 32 caliber H. & R. Automatic Revolver, one 32 caliber Hopkins & Allen Revolver, as well as Bowie Knife and two dozen Gillette Razors. The firm calls attention to the matter with a view to warning its brother merchants against buying the goods from strangers who call upon them.

GEORGE H. WARREN died at his summer home in Greenwich Village, Mass., September 11, in his sixty-fourth year. Mr. Warren had traveled about 30 years for several well-known manufacturers, including the Wells Bros. Company and Goodell-Pratt Company, Greenfield, Mass.; Holley Mfg. Company, Lakeville, Conn., and the Lamson & Goodnow Mfg. Company, Shelburne Falls, Mass. He was well known in the Hardware trade in New York and New England and his genial personality will be greatly missed by a large number of loyal customers, who were also his personal friends.

THE attention paid to the manufacture of large Nuts by the Milton Mfg. Company, Milton, Pa., is indicated in a pamphlet devoted to this portion of its product, which contains mammoth illustrations of these goods. The company has worked and experimented until it has developed Nuts which meet the requirements of builders of engines and other highly finished machines. The Milton Nut is referred to as possessing the four essentials of a perfect Nut—namely, quality, efficiency, finish and accuracy.

IRVIN KNOX has purchased the Hardware business of T. E. Jeffries, Hale, Mo.

# Parade Float of a Kentucky House.

## Making a Hit in a Circus Procession.

THE visit of a circus to the city was made the occasion by W. A. Guenther & Sons, Owensboro, Ky., for getting up the float which is reproduced herewith, and which attracted much attention from the large crowd assembled to witness the usual parade. The float occupied a place immediately in the rear of the procession and was the subject of much favorable comment.

It was drawn by three exceedingly fine Kentucky bred draft horses, dressed up especially for the occasion with signs, plumes, &c. The wagon displayed a representative line of housefurnishings, a department which, by the way, is a new departure for the house. In addition selections from their regular lines of Stoves and Ranges, Sporting Goods, Mechanics' Tools, Paints, Oils and Varnishes, Wire and Wire Fencing, Pumps, Silver Plated Ware, Cutlery, &c., were displayed.

*Float Used by W. A. Guenther & Sons, Owensboro, Ky., to Direct Attention to Their Business in Connection with Circus Parade.*

## The Atlantic City Conventions.

THE formal programme for the meeting of the National Hardware Association, which will be held concurrently with that of the American Hardware Manufacturers' Association at Atlantic City, Oct. 13, 14 and 15, will soon be issued. As outlined, the Executive Committee will meet on Monday and Tuesday, October 11 and 12, for a preliminary review of the affairs of the organization. Houses comprising the metal branch of the association will confer on Tuesday afternoon.

The opening session of the convention will take place on Wednesday forenoon at 10.30, a feature of this session being addresses by the president of the American Hardware Manufacturers' Association and fraternal delegates from other trade organizations. Executive sessions will also be held on Wednesday afternoon, Thursday morning and on Friday. On Thursday afternoon there will be the usual joint session with the American Hardware Manufacturers' Association, in which matters of common interest to both will be considered.

The principal entertainment features are a reception tendered by the Manufacturers' Association on Wednesday evening, the annual banquet on Thursday evening and a card party, under the auspices of the ladies, on Friday evening.

## The St. Louis Centennial.

FESTIVITIES celebrating the 100th anniversary of the incorporation of the City of St. Louis, Mo., will be held October 3 to 9, inclusive. Aeroplane, airship and balloon contests, a water pageant, in which a number of United States war vessels will participate, a municipal pageant, an industrial pageant with more than 200 floats, and an educational, historical and military pageant will be among the features that will mark the occasion. Other attractions will be the Veiled Prophet's pageant and ball, a banquet at the new Coliseum at which more than 2000 persons will be present, a costume ball of all nations, also at the Coliseum, and an impressive parade of automobiles.

The St. Louis Centennial Association has obtained reduced railroad rates for the week from practically all parts of the United States, including the Pacific Coast. Cordial invitations to their customers are being sent out by the Norwell-Shapleigh Hardware Company, Simmons Hardware Company and other St. Louis Hardware houses. The Simmons Hardware Company will open a special branch office at 821 Washington avenue, which will be maintained for the purpose of looking after the wants of its friends and customers and supplying them with information regarding the events of the week.

## New England Iron and Hardware Association's Outing.

THE New England Iron and Hardware Association had favorable weather for its outing at the Tedesco Country Club, Swampscott, Mass., on Wednesday, 15th inst. There was a large attendance and an unusual number of entries in the golf tournament, which was in charge of a committee headed by Wilbur Sargent Locke. The first prize was won by George A. Sagendorph; second by Austin H. Decatur; third by Allan J. Chase. Harry L. Doten had the lowest gross score and accordingly retains the association cup for another year.

Dinner was served at 6 o'clock, and there were no formal exercises afterward, but Col. Morris K. Belknap of the Belknap Hardware & Mfg. Company, Louisville, Ky., who was present as the guest of Samuel A. Bigelow, happily responded to a greeting on behalf of the association by its president, A. B. Marble. The Committee of Arrangements, with R. H. Boutwell, chairman, and George J. Mulhall, clerk, provided every possible comfort for visitors, and the place selected was particularly adapted for a meeting of this kind, furnishing as it did both indoor and outdoor amusements and accommodations.

# Hardware Merchants on Up-to-Date Topics.

## Early Ordering of Goods—Articles Called For Not Carried in Stock—Decadence in Towns and Villages.

## The Retail Merchant Ordering Goods.

### Importance of a Good System—Buying Early and Before the Busy Months.

#### Practical Suggestions from a Vermont Merchant.

*To the Editor:* The matter of buying seasonable goods in time to meet the season demands is an important one, and one to which careful and systematic attention should be given. A stock book of seasonable goods is a convenience. For instance, at the end of the Skate season a record of stock is taken, and when the time comes the season's order is copied into the book and a clear record for ready reference is had of just what was on hand at the beginning of the season, just what was bought and just what was sold.

**The Merchant Who Is Doing Things**

would buy Skates, Weather Strips, Thermometers, Snow Shovels and other fall and winter goods in June and July, making up the orders from his stock or stock record. Farm Fencing, Poultry Netting, Wire Cloth, Screens, Screen Doors, Lawn Mowers, Garden Hose and other spring and summer goods would be bought in January and February and the orders made up from inventory records. Early shipments would be ordered to take advantage of all datings, cash discounts and deliveries.

**Price Advantages.**

Liberal buying for April, May and June trade is good business, for quantity prices can often be obtained, and it certainly is a great advantage in those busy months to have a good stock and as few orders as possible to make up, as time can be best used in selling at a season when the general demand for goods is at its hight. Careful attention should be given to advertising and displaying seasonable goods in their season, all of which is simple enough if proper interest is given them.

VERMONT.

## A Practical Question.

### What to Do When Goods Are Called For Which Are Not Carried in Stock.

#### A Wisconsin Merchant Tells How to Increase and Hold Trade.

*To the Editor:* We believe it is practical as well as profitable for merchants to take orders for goods which they do not carry in stock. In fact, we believe it is an almost absolute necessity that a merchant do everything in his power to secure goods for customers who are in need of something not carried in stock by his dealer.

**Merchant Should Accommodate the Customer- It Pays.**

In smaller towns there are a great many things on which the sale is so limited that it does not pay the merchant to carry them in stock, and when a customer calls for such it is well for the merchant to accommodate him and secure the goods for the customer even though he makes no profit on same. We make a practice of ordering anything that any of our customers may ask for, and ordering them promptly and getting them as soon as possible, and we believe that it has done us a great deal more good than we realize.

There is nothing that a customer appreciates more than to have his dealer secure for him anything that he may be looking for and which is not carried in stock, and it is these small favors that not only keep but increase trade.

WISCONSIN.

## The Decline in Towns and Villages.

### Good Work of Agricultural Schools.

#### Letter from a Well-Known Minnesota Merchant.

That there has been a drift of population from the country to the cities, no one can deny, and especially is this true of the older portions of the country. The postmaster at the crossroads was invariably the storekeeper, and then would spring up a little settlement with a blacksmith shop, and the farmers would gather at the store to trade and enjoy the society of their neighbors.

**Thousands of Post Offices Abolished.**

Where are these post offices now? Abolished. The report of the Post Office Department shows that from June 30, 1900, to January 1, 1907, there was a decrease of 12,585 postmasters. The same authority shows that this reduction was in 33 States, an average of about 400 to each State, while an increase was shown in 22 States and Territories, which included Alaska, District of Columbia, Guam, Hawaii, Porto Rico and Samoa. A study of this interesting report of the Postmaster-General shows that the decrease was in those States in which the largest number of rural routes have been established.

**Rural Routes and Catalogue Houses Responsible.**

This shows conclusively that the introduction of the rural routes, together with the catalogue house, has been the main factor in the decadence of the small cities and rural communities. The establishment of a general parcel post system would but aggravate these conditions. The catalogue houses would do an increased business, and as population follows commerce it follows that there would be a still further drift of population to the large centers.

If the parcel post could be confined to rural routes only it would be of little damage to the community; neither would it be of benefit, as the farmers are using the routes now at much less expense than it is proposed to charge under postal regulations.

**Valuable Instruction at State Agricultual Schools.**

Our various State agricultural schools have been trying to overcome the growing tendency of the young men to leave the farm. They are teaching the young men who enter these schools that farming is one of the most scientific occupations in which a young man can engage. Education along these lines, together with the telephone, rural delivery and the good road agitation that is being spread broadcast, should, and I trust will, have a tendency to keep the younger generation on the farm, where they can enjoy many of the real advantages to be found in city life. None will be quicker to recognize these advantanges and to help in this work than the retail merchant.

**Farm Renters Not Desirable.**

One drawback in this locality is the fact that many of our farmers are leaving their farms and renting them. These renters, as a rule, are not thrifty or progressive. Such farms do not produce what they should in consequence and the community is deprived of the resources to which it is justly entitled.

MINNESOTA.

T. A. Hester, Pulaski, Iowa, has bought the retail Hardware stock of John B. Sawyer, Corin, Mo., and will move the business to Jacksonville, Mo.

# The New Establishment of the Stichter Hardware Company.

## Store and Equipment in Harmony with Modern Business Requirements—An Example for Enterprising Managers.

ABOUT a year ago the store of the Stichter Hardware Company, Ltd., Reading, Pa., was destroyed by fire. Now, after a 12 months' absence, the company is back again installed in handsome new quarters extending from 505 to 509 Penn street, with annexes at 11 North Fifth and 510-512 Court streets.

### The Main Building.

The building, a T-shaped structure, was erected by the contracting firm of George W. Beard & Co., A. J. Fink of that firm superintending its construction. The main building is on Penn street, the imposing front of which is 60 ft. wide and with a depth of 122 ft. There is a drive entrance on Fifth street and an exit on Court street, so that teams may enter at one point and, passing through the building, emerge on the other side, conveniently discharging incoming freight or picking up outgoing shipments from the platforms arranged in accordance with the necessities of modern transportation, a cardinal feature of which is expedition in dispatching goods and discharging and loading under cover free from interfernce of the elements.

### An Imposing Front.

The principal building on Penn street has a front of light brick, a terra cotta cornice and trim, granite base and a tin roof, in the laying of which Stichter's Special I X Roofing Plate was used. Light is admitted through large single panes of polished plate glass, which is increased, especially in the interior portions, by the addition of about 100 sq. ft. of prism glass above the plate glass. The entire structure is generously equipped with windows, so that artificial light is unnecessary in the offices or store during the daytime under ordinary conditions. The rear doors leading to the annexes and elevators are tin lined fire doors, operating automatically when necessary, and all windows, excepting those lighting the fronts, work in sheet metal frames and are glazed with wire glass to make the building as nearly fireproof as possible.

### Comprehensive Lines Carried.

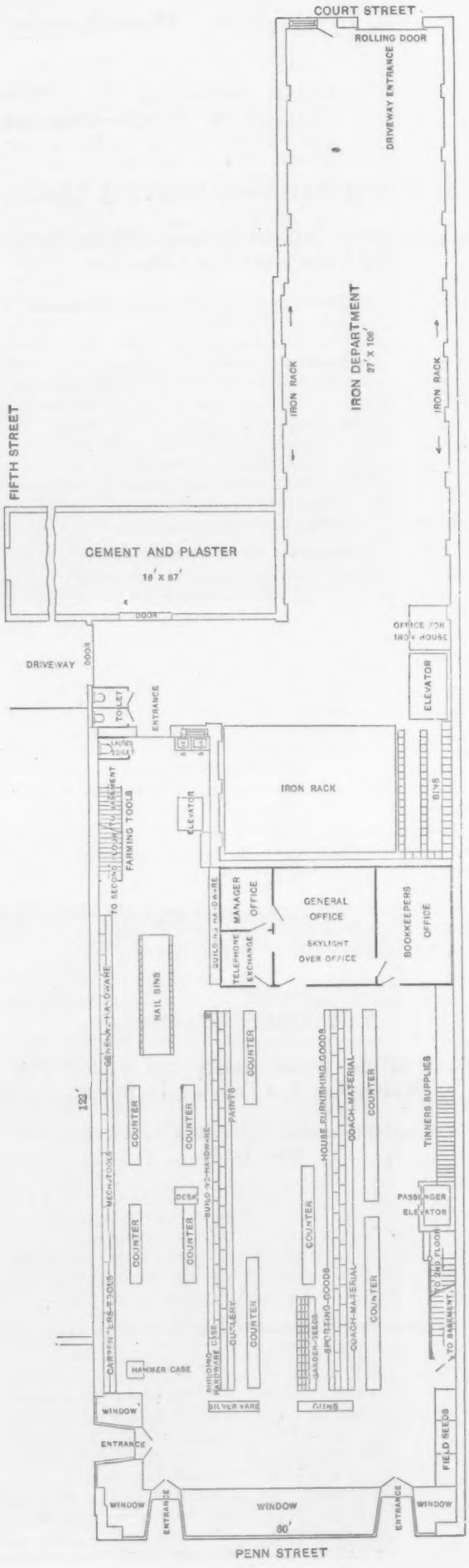
The entire structure, with the Fifth and Court streets annex, is used by the company solely for the sale of Hardware, Iron and Steel, Builders' Supplies and Tools, Coach and Wagon Materials, Tin Plate and Tinners' Supplies, Sheet Iron, Hatters' Supplies, Heavy Chemicals, Paint, Oil, Glass, Cement, Plaster and Field and Garden Seeds.

### Elevators.

It is equipped with three of the most modern Otis elevators, the largest of which has a capacity of 4500 lb. and is all steel construction; the smaller freight elevator has a capacity of 2200 lb. The passenger elevator, serving all floors from the basement to the fourth floor inclusive, has all the latest automatic stops.

### Character of the Inside Trim.

The office partitions, shelving, cases, counters, &c., on the first floor are all solid oak, and the display boxes galvanized iron with oak front. This floor is used for offices as well as wholesale and retail business. Having in mind the advantage of commodious offices and the helpfulness of proper equipment, the space required for such purposes is subdivided into four parts, which includes general, private and bookkeepers' offices and a telephone exchange serving 22 stations.




*Floor Plan of the First Floor in the New Establishment of the Stichter Hardware Company.*

*Builders' Hardware Section.*

The west side of 507 Penn street is utilized for Cutlery, Housefurnishing Goods, Paints in oil and Varnishes. The east side is devoted to Garden Seeds, Enameled Ware, Sporting Goods, Guns, Rifles and Ammunition. The Garden Seeds are stocked in a 52-drawer oak supply case, which when Seed selling is out of season is transformed into a counter 3 ft. wide for displaying Sporting Goods.

The west side of 509 is used for light coach material, such as Lamps, gold and silver plated; Nickel Plated Hub Bands, Handles, Tips and Whiffletrees. There are also Carriage and Coach Painters' Brushes and Dusters. On the other side provision is made for Light Tinners' Supplies.

**The Second Floor.**

On the second floor there is a packing and shipping room and a room 18 x 34 ft. for all kinds of enameled leather, muslin and various textures in cotton duck, with such coach material as requires a warm temperature. The remaining space contains a large malleable iron rack, belt rack, Farming Tools and reserves of Building and General Hardware.

*The Department of Cutlery, House Furnishing Goods, Oils, Paints and Varnishes.*

*Shelving and Cases for Coach Material, Both Stock and Samples.*

### Sample and Sales Rooms.

The sales department is also on this floor and contains 3920 sq. ft. of shelving, 531 sq. ft. of glass wall cases and 40 lineal ft. of "silent salesmen" cases, with plate glass tops and sides. There are also 108 steel Nail bins and 630 Screw bins. This portion of the floor is divided into three sections of 18 ft. each. The west side of 505 Penn street is occupied by the Tool department and has a total of 224 sq. ft. of wall cases for displaying Saws, Planes, Razors and Hatchets. Hammers are sampled in one of Keller's Hammer cases. Machinists' Tools are shown on an area of 32 sq. ft. of plush covered show cases. In the rear there is general Hardware, with a rack to hold Farming Tools.

The opposite side contains building material of all kinds. Locks are arranged in a solid oak case having a plate glass front, with eight display doors and 15 Turner anti-friction self-supporting drawers and illuminated with six electric lights. This case is an exceptionally fine piece of workmanship, and in the matter of space is the most economical Builders' Hardware display in that section of the country.

*The Display of Saws, Planes, Razors, Hatchets, Hammers and Machinists' Tools.*

### The Third and Fourth Floors.

Passing to the third floor, provision is made for Heavy Tinners' Supplies, Black and Galvanized Sheet Iron, Corrugated Iron, Corrugated Conductor Pipe and Eave Trough, Elbows, Registers, Enameled Ware, Tinners' Tools and all kinds of Oil Cloth, Wire Cloth and Netting.

The fourth floor is equipped with racks for Carriage and Wagon Wheels, the dimensions of which are 122 x 36 ft.; racks for Screen Doors, Window Screens, Field Seeds, Wheelbarrows, Mounted Grindstones and Lanterns in suitable capacity for quantities likely to be used for daily shipments.

### The Basement.

The basement has racks for 368 sizes of Glass for retail and 1400 ft. of space for the full boxes. The central part is used for Nails, Cedar Ware, Dry Paints and the larger sized vessels of Paint and Oil. The west side accommodates Wooden Pumps, Rope and Excelsior. There are also three vaults, each 18 x 22 ft., for storing Oils and Varnishes, which are adequately lighted with three-way prism glass.

### The Annexes.

The 510-512 Court street annex is 27 x 106 ft., two-story brick, with sandstone trimmings. The first floor is fitted with racks capable of accommodating 717 different kinds and sizes of Iron and Steel, one rack being capable of sustaining over 200 tons of Iron. In addition there are racks for 180 different kinds and sizes of Horseshoes, with bins for Machine Bolts, Lag Screws, Nuts, Washers, Chains and Metals.

The second story of this building has a 4-in. floor on 24-in. steel girders and is used for storing Springs, Axles, Fifth Wheels, Gears, Anvils and Vises. Traveling men who have examined it speak of it as probably the strongest and most complete Axle and Spring room in the State.

The annex at 11 North Fifth street is 16 x 87 ft., two stories, with cellar. The first floor is used for Sash Weights, Cement, Chemicals, Fence Wire and kindred materials for the retail trade. Bulky goods are carried on the second floor, such as Rims, Shafts, Hubs and Spokes, and in the cellar Charcoal, Fodder Twine and Washing Machines.

### Storage Warehouses.

The company, in addition to the spacious buildings described, has two warehouses located on the Reading Railroad siding, one for Cement and Plaster, 30 x 60 ft., and the other for Screens and Screen Doors, Poultry Netting, Washing Machines and other material too bulky to be stored in the Penn street building. There is also another warehouse on the Pennsylvania Railroad siding, 24 x 70 ft., for receiving Heavy Chemicals, Drugs and Hatters' Supplies.

### New Plant the Fifth Occupied by the Firm.

The plant just described is the fifth occupied by the house since the business was founded. There is a photograph of the original store hanging in the private office of the company. That building was a two-story structure, 20 x 20 ft., making available about 800 sq. ft. of floor space, while the present total floor space in store annexes and warehouses is over 60,000 sq. ft., or about 1½ acres.

*Section Devoted to Seeds, Sporting Goods, Firearms and Ammunition.*

### Executives of the Company.

The officers of the company are L. D. Stichter, E. D. Millholland and A. B. Stein, the latter being treasurer and manager. Mr. Stein had full charge of the construction of the new building, and all shelving was erected under his supervision.

The house of Stichter is to be congratulated on its practical recognition of helpful ways and means required to-day to conduct a steadily growing business and meet the lively competition which has arisen in later years.

## Early History of the House.

The property where the store now stands has quite a history, as it was bought from Thomas Penn and Richard Penn by Conrad Weiser August 15, 1751. Conrad Weiser used this as an Indian trading post. The history of Conrad Weiser states that it had been his headquarters for some years after he left his parents and brothers in New York. According to the history, most of the difficulties between the whites and Indians were settled by Conrad Weiser, who was known as the Indians' friend. The present building contains a memorial and tablet to Conrad Weiser, erected seven years ago, by the Historical Society of the city of Reading, as he was considered the bravest man in his community.

### The "Old White Store."

In 1789 the property was purchased by Keim & Son, who opened the "Old White Store," for the sale of Hardware. They continued in business till 1803, when Geo. D. E. Keim & Son took it and held possession until 1837, at which time Keim & Stichter became the proprietors. In 1841 the firm was again changed to Stichter & McKnight. 1858 the partnership was dissolved, and J. L. Stichter, the senior member, continued until 1872, when his son, Thos. D. Stichter, was taken into the business, the firm being then known as J. L. Stichter & Son. This style continued until 1893, when the Stichter Hardware Company, Ltd., was organized.

In the early days of the "Old White Store" the Nails sold by the firm were manufactured by Samuel Yeich. About 50 lb. of Nails were made in a day by means of a simple hand machine, and this was sufficient to keep the market supplied. Mr. Keim cut the Nails from band iron, while his son headed them. In those days Hardware was all imported from England and Germany and nothing was known of packing the goods in pasteboard or wooden boxes. Everything was wrapped in paper and tied with very strong twine, making very unsightly packages on the shelves.

### Interesting Relics.

Among old relics of Hardware still in the possession of the company are a Gun Lock 9 in. long, weighing 2⅝ lb., and a pair of Candle Snuffers 20 in. long, weighing 2¼ lb. These old relics are prized very highly and were the first articles used to make a window display in the present new building.

## The Arkansas Retail Hardware Association.

W. L. HARLAN, Little Rock, secretary of the Arkansas Retail Hardware Association, reports that the association work is being pushed energetically, and that a constant increase in membership is noted. The work done by the association during the past year has attracted the attention of merchants throughout the State, and already many inquiries are being received as to the next annual convention which will be held in Little Rock during the month of May, 1910.

Plans are now on foot to make this meeting the largest and best ever held by the association, and it is expected that several entirely new features will be introduced. The Hardware exhibition feature will be continued, and the commodious Auditorium has been engaged, this structure being favorably located and sufficiently large to take ample care of exhibitors' requirements. Special attention will be given to hotel accommodations, and the entertainment provided by the city at large, as well as the Hardware jobbers and retailers, will be exceptionally attractive.

The Arkansas Association maintain a freight bureau, which has been organized for the exclusive benefit of its members. It is under the efficient management of Secretary Harlan, who invites the members to send in their freight expense bills for examination as to their correctness.

MUCH is being said and written about the wonderful achievements of exploration, which, after centuries of effort, have finally resulted in the placing of the American flag at the North Pole. While the merits of the case are being discussed by scientists and the people generally, the Simmons Hardware Company, St. Louis, Mo., is giving publicity through the daily press in an advertising campaign of the fact that Keen Kutter Tools comprised an important part of Commodore Peary's equipment in his Arctic journey. During his lecture tour in 1907, while in St. Louis, he was discussing the primitive Tools and Instruments used by the Eskimos, and his attention was called to the Keen Kutter Tools, as a result of which, it is stated, he selected and took with him five chests of Keen Kutter Tools for use and as a medium of exchange in his dealings with the Eskimos.

## Price-Lists, Circulars, Etc.

*Manufacturers in Hardware and related lines are requested to send us copies of new catalogues, price-lists, &c., for our Catalogue Department and for notice in this column.*

INDIANA FOUNDRY COMPANY, Indiana, Pa.: Catalogue No. 7 illustrating Martin Stump Machine, Dirt Tamper, Post Mauls; Farm, Church or School Bells, Lawn Rollers, Cant and Mill Hooks, Pavement Coal Hole Vault Rings, Ash Pit and Furnace Doors, Tire Benders, Cesspool and Cellar Traps, Truck Wheels; Shafting, Pulleys and Hangers, Heating Stoves, Lawn Vases, &c.

ENTERPRISE FOUNDRY & FENCE COMPANY, Indianapolis, Ind.: Catalogues Q and R. The former relates to Combination Wire and Ornamental Lawn Fences for all purposes, Woven Wire Field Fence, both square and diamond mesh, Iron Fence Posts and Wrought Iron Picket Fence, ornamental or plain. Catalogue R is devoted to a more extended line of Wrought Iron Plain or Ornamental Picket Fences; also Entrance Gates and Lettered Arches, Hitching Racks, Railings, Window Guards, Area Gratings, Fire Escapes, Iron Stairs, Iron Vases, Lawn Guards, Settees, &c.

H. L. BROWN FENCE & MFG. COMPANY, Norwood, Ohio: Attractive catalogue devoted to Woven Wire Fencing for lawns, parks, cemeteries and factories, Ornamental and Farm Gates, Ornamental Steel Gates, Flower Bed Guards, Trellis, Tree Guards, Settees, Hitching Posts, &c. The company refers to its goods as made of the highest quality of raw material by skilled workmen.

KAMPFE BROS., 8 Reade street, New York: Revised, illustrated, descriptive 18-page booklet, envelope size, of the Star Safety Razor and accessories, in many styles and assortments, together with the Star double shearing Nail Clipper and Star Safety Corn Razor.

C. S. NORCROSS & SONS, Bushnell, Ill., catalogue of 24 pages, No. 2, illustrating in color marked improvements in the Norcross Land Garden Cultivator. They insure a quicker adjustment, the tool is made of square (not round) steel, which increases the strength, and there is a detachable handle socket which makes the implement a combination Hand Cultivator and Wheel Plow attachment; practically two tools in one.

CASSADY-FAIRBANK MFG. COMPANY, 6106-6130 La Salle street, Chicago, Ill.: 128-page illustrated catalogue of Hardware Specialties, Steel Stampings and Automatic Machine Work, including Kitchen Utensils and Housefurnishings, Screw Drivers, Ferrules, Kettle Knobs, Pot Covers and Cabinets, Stove Furnishings, Bathroom Fixtures, Garment Hangers, Nut Cracks and Picks, Curling Irons, Tracing Wheels and extended assortments of kindred goods in great variety.

DAYTON MALLEABLE IRON COMPANY, Dayton, Ohio: 10 extra leaves for regular catalogue relating to Steps, Fifth Wheels, Perch Irons, Double Tree Clips, Rail Eyes and Screw Clamps.

AMERICAN STEEL & WIRE COMPANY, Chicago, Ill.: 24-page illustrated booklet, envelope size, relating to Supplies for the operation of mines, including Wire Rope, Trolley, Weatherproof, Magnet, Armature and Rubber Covered Wires and Cables, Haulage Ropes, Lead Covered Cables, Rail Bonds, Railroad and Boat Spikes, Nails, Horseshoes, &c.

ST. LOUIS SCREW COMPANY, St. Louis, Mo.: Illustrated catalogue of 68 pages, containing current standard lists. This is the sixth edition of the book, which covers comprehensive lines of Bolts, Nuts, Coach and Lag Screws, Taps, Washers, and much valuable information in tables relating to threads, weights per 100, &c.

C. G. BARKLEY MFG. COMPANY, Albany Street, Schenectady, N. Y.: Folder illustrating and describing the Gem Slicing Machine, which slices ham, bread, bacon, cabbage, pineapples, cheese, cake, &c. The workmanship and finish of the Slicing Machine is especially referred to. This machine was formerly made by the Horton & Link Mfg. Company, Herkimer, N. Y.

I may not triumph in success
Despite my earnest labor;
I may not grasp results that bless
The efforts of my neighbor.
But though life's dearest joy I miss
There lies a nameless strength in this—
I will be worthy of it.

—*Ella Wheeler Wilcox.*

## Stand Well with Yourself.

Most people are oversensitive about what other people think of them. Every well balanced person is anxious to be well thought of. This is a worthy ambition; but there is only one person's whose good opinion you cannot get along without, and that is YOUR OWN. It is possible to live even a successful life with the ill opinion of all who know you; but you must have your own approval, or you will be a failure. There are men and women misunderstood and denounced by the world who yet are able to walk serenely, calmly, without wincing or flinching, because they have never forfeited their good opinion of themselves. They have never lost their own approval, and as long as they hold this nothing else can matter very much; but with this lost all is lost.

**Courting Failure.**

You can stand all sorts of disappointments that come unbidden, and after you have done your level best, but disappointment with yourself is fatal. You can outlive the others; you can live down a scandal, abuse, failure, if you have been honest and have tried your best, but how can you live down the abuse which you give yourself, the wound to your self-respect, the stain upon your honor? When you GO BACK ON YOURSELF nobody else can help you. If you have lost faith in your best friend, your own self-respect, where will your life structure rest, when the very foundation stone is gone? The consciousness that you are right yourself, the consciousness that you have been perfectly honest and sincere and have done the right thing, the square thing as you see it, will sustain you and buttress you against all the assaults of the world. But without this defense you will very quickly fall.

**Going Back on One's Self.**

You may survive the lack of confidence of the world; if you are honest you may get along fairly well, even though everybody else denounce you; but if you go back on yourself, if you prove a traitor to that principle which is nearer to you than your breath, closer than your heartbeats, how can you expect to get the confidence or respect of others? If you do not believe in yourself, you cannot expect others to do so. There is one thing with which no man should part. Let everything else go, if you must—friends, property, bread and shelter, even—but never part with your belief in yourself. HOLD FAST TO YOUR SELF-FAITH with your last breath; you are worth nothing without it either to yourself or to the world.—*O. S. Marsden.*

**A Priceless Possession.**

## Grasping the Right Opportunities.

Opportunities exist on every hand and we are continually grasping them. Whether or not we grasp the right ones is a matter of excellence of judgment. There are only two paths to travel. One leads to success. The other leads to failure. Every little while we come to little bypaths which are short cuts. Some of them bring us out upon the path of success. Others carry us backward toward failure. Those achieve success who choose helps to success. To a young man the question comes: "Shall I go out with the boys to-night and develop more skill on the pool or billiard table, or shall I stay at home and study this book which will increase my mental power, visit this successful man whose talk will inspire me, go out for a row or a tramp, or to a gymnasium for exercise which will develop more physical power?" Upon his answer depends his advance toward greater success. Possibly he chooses the good time with the boys in the poolroom and does it because he honestly thinks that is the best thing to do.

**Helps to Success.**

But he is rendering a judgment upon insufficient information. He does not see that either of the other courses would YIELD GREATER SUCCESS RETURNS. He says, "My nature demands pleasure of this kind. It helps me far more than the pleasure you would choose for me." Probably it does. If he is honest he can find out what has been the experience of those who solved that problem in the past. If the majority of those who frequented the poolroom succeeded and the majority of those who studied to become more efficient failed, then his judgment that the poolroom is best is correct. He proudly says, "I have done nothing that I am ashamed of." That is being negatively good. But why is it that he does not say, "I am proud of the success that I have achieved through doing this thing"? Is he sure that he has chosen the better part? Have men more confidence in him because of his choice? Is his promotion apt to be as fast when following the path he has chosen as it would be were he to follow some other? You can see that it is but a matter of judgment—of choice.

**Others' Experience.**

In marking out a life policy it is not so hard to choose. Men have done that in the past. By following a certain policy certain men succeeded. Those who did not follow that policy failed, or at least did not achieve CONSPICUOUS SUCCESS. The only question then is: "Is it worth while to achieve a success similar to those who have served greatly, or is it wiser for me to follow the route of those whose lives merely illustrate the result of following cheaper pleasures that possessed a greater momentary glitter?" Every man must, indeed, live his own life, and it is true that each must make his own choice. What is yours? Can you PROVE that yours is best?—*Thomas Dreier.*

**Life Policy.**

## Pointers for the Salesman.

Remember, a genial smile is a weapon which a buyer often falls under.

A voice well cultivated is an important factor in a salesman's equipment.

A cheerful, optimistic salesman is always more welcome than a pessimistic grouch.

A buyer, being a human being, has troubles of his own; don't air any of yours in his presence.

If a salesman will consider all points which come up in his vocation from the other fellow's point of view, he will find it helpful.

A salesman should always make it a point to keep well posted on the general trend of his special line through trade journals as to prices, demand, supply, &c.

A salesman who studies the art of "butting in" at the proper time usually carries his point.

The high grade salesman never stoops to disparage the standing of a competitor.—*William C. Collins, sales manager Keystone Steel & Wire Company.*

## Capewell Horse Nail Company's Trademark on Head of Horse Nails Sustained.

SOME years since the Capewell Horse Nail Company, Hartford, Conn., brought suit against Walworth M. Mooney for using a similar check mark to the one used since 1892 by the Capewell Company on the heads of its horse nails, and which was registered as a trademark in 1903 under the Federal statute of 1905. Judge Ray, before whom the suit was tried, rendered a decision in favor of the Capewell Company. Appeal was taken by Mr. Mooney, and a decision affirming Judge Ray's position has recently been handed down by Judge Lacombe of the United States Circuit Court of Appeals, Second Circuit. As of interest in connection with the subject of trademarks, we give the decision in full as follows:

### Text of Judge Lacombe's Decision.

This cause comes here upon appeal from a decree of the Circuit Court, Northern District of New York, enjoining defendant from making, using or selling or offering for sale Horse Nails bearing the trademark of complainant, such as have been heretofore made and sold by defendant, or bearing any mark so similar to complainant's trademark as to be likely to deceive purchasers and the public.

**The Mark.**

The mark consists of a pattern of small checks, formed by lines crossing each other diagonally, stamped upon the under or bevelled side or front face of the head of Horse Shoe Nails and substantially covering the surface of that particular face. It is not a rhomboid, but has four sides, the upper and lower sides being parallel, but unequal, the upper being the longest. The right and left sides are of equal length, but not parallel. Within these boundaries are the check marks.

No complaint is made of the marking or dressing up of the packages in which defendant's Nails are sold by him, but it is in evidence that such packages are frequently broken up and the contents sold to users by the pound and that users are accustomed to look to markings on the Nail itself as identifying the maker.

Various marks have been placed on the front face of nail heads by different makers—initials, &c.—and, in the case of one maker, a globe with intersecting meridian lines (readily distinguishable from complainant's mark); there is also some evidence, not especially persuasive, that check marks had been used on the top of the head as the distinguishing mark of another maker. But the record does not show that this particular mark on the front face was in use before its adoption by complainant and its association in the public mind with Horse Nails made by it.

**Trademark Registered.**

Complainant registered this trademark, No. 56,605, dated October 6, 1906, and the bill charges infringement of such registration. Several objections to the validity of this registration are urged by defendant, but it is not necessary to discuss that branch of the case, since the court found that complainant had a common law trademark and that defendant had placed the mark on the front face of his nail heads "for the purpose of simulating complainant's Nails and producing confusion in the minds of dealers and users and selling his Nails as those of complainant's make."

Such acts constitute unfair competition in trade. It is idle to contend that the Circuit Court had no jurisdiction to pass upon the question of common law trademark. There is the requisite diversity of citizenship and the averment in the complaint as to the statutory amount in dispute is not denied in the answer, nor was any such objection interposed by plea.

The opinion of Judge Ray is most exhaustive and no useful purpose would be served by a rediscussion of the facts. He found that:

> This well defined check mark was first appropriated and adopted by the complainant as a trademark and its trademark, and that it was so adopted and appropriated and thereafter used primarily for the purpose of identifying and distinguishing Horse Nails of complainant's manufacture from those of all other makers and not as an incident of manufacture or primarily for ornamentation.

Also that:

> The fact of such adoption and appropriation was extensively and sufficiently made known to the public by actual and continued use by complainant as such, same being affixed to its Nails, and also by publications and otherwise; that by such use thereof on the goods of complainant's manufacture such check mark came to be generally known to the public as complainant's trademark and its goods bearing such mark on the Nail came to be publicly known and distinguished as those of complainant's make.

**Improved Appearance.**

The evidence tends to establish the affirmative of the first of these findings, but the second of them is the more important one and the record fully sustains it. The improved appearance of the Nail was immediately taken up as a feature for advertising and was so advertised as the distinctive characteristic of Nails made by the Capewell Company. In Capewell Horse Nail Company *vs.* Putnam Nail Company, 140 Fed. Rep. 670, a suit to restrain infringement of this same mark, Judge Colt held that complainant had not proved that it had ever claimed the check as a trademark nor that there was any association in the public mind of the check pattern with complainant's Nails.

Except for a circular issued in 1897 calling attention to the check mark as indicating Capewell Nails (which is in the record here), we do not know what was in evidence before Judge Colt, but it must be presumed that the proof before us as to the distribution of nearly 100,000 of these circulars among blacksmiths and Hardware merchants as to the statements of salesmen to customers and as to the recognition of complainant's Nails by this mark was lacking in that case.

As to the arguments advanced by defendant that check marks have been used on other articles as ornaments or for purposes of utility; that the mark is ornamental and that such circumstance led to its adoption, that it is indefinite and that complainant uses a different mark on its packages from the one applied to its Nails Judge Ray's opinion sufficiently sets forth the law, and we find no error in his conclusions.

**Not a Necessary Incident of Manufacture.**

The real point in the case is whether the mark which defendant stamps on its Nails, a Chinese copy of complainant's, is put there as a necessary incident of the process of manufacture. Checks or knurling of similar pattern had long been in use to form gripping surfaces, as in forceps, tweezer, vises, &c., where they are cut on the interior surfaces of the jaws of the gripping devices. They had also been used on the handles of various tools to prevent the slipping of the hand of the workman when grasping the tools.

Conceding that the general public has the right to use this check mark to form a gripping surface when necessary, the Circuit Court states the proposition as follows: "Whether the defendant used the check mark in manufacturing Horse Shoe Nails, as a gripping surface or for the purpose of imitating the complainant's mark and manufacture so as to pass off his Nails as those of complainant." The mark on the face of the nail head is produced by a check mark on one of the rolls between which defendant's Nails are passed, and he contends that without its use as a gripping surface the Nail will frequently slip and a large percentage of imperfect Nails will be found in the output.

The record contains a large amount of evidence on this branch of the case, and here, as in the Circuit Court, the proposition above stated has been argued at great length and with great ability. The most we can say is that the proof leaves it doubtful whether or not the defendant could economically and efficiently manufacture its Nails without a gripping surface on its small roller, which would impress permanent marks on the front face of the nail head.

On this branch of the case defendant, who cannot reasonably dispute that his mark there placed is substantially like complainant's, has the burden of proof. But we concur with Judge Ray in the conclusions that "if it was necessary to have a gripping surface on the roller it was not necessary to use the only one of many which would produce (on the face of the nail head) the exact counterpart of complainant's distinguishing mark, which had come to be known in the trade and among manufacturers and dealers in and users of Horse Shoe Nails," and that "the production of *this* check mark on the defendant's Nails is not a necessary incident of manufacture."

The decree is affirmed with costs.

## Crimped Diamond Wire Screens.

The Diamond Wire Web Company, Columbus, Ohio, offers screens of double crimped heavy steel wires woven in diamond form. In Fig. 1 is shown an adjustable steel frame with compression rails, rigidly securing the fabric.

To the angle steel frame are riveted, at suitable intervals, clamp hooks provided with screws, which compress

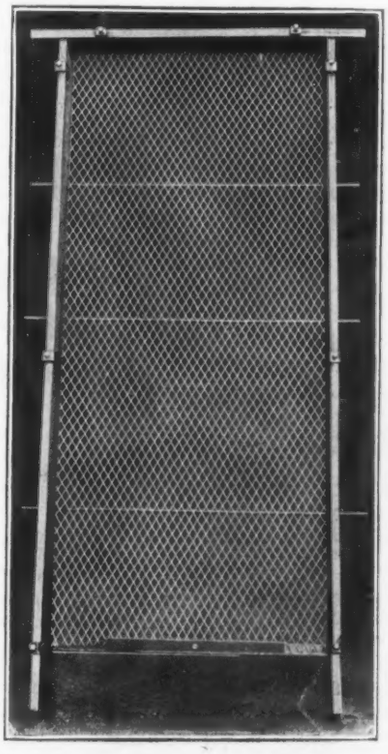


*Fig. 1.—Adjustable Crimped Diamond Screen and Steel Frame with Screen Set to 1 In. Mesh.*

the wooden rails securely on the edges of the fabric, no staples or nails being used in construction. To change the size of the mesh and frame, the clamp screws are loosened and the rails removed, when the fabric can be compressed or expanded to the opening desired. The frame is then adjusted to the fabric by means of the adjusting bolts, the rails replaced and screwed down on the fabric. The standard diamond screens are put up in rigid wood frames, Fig. 2, in a large number of meshes and wires, and designed to meet the demand for a one mesh, low priced screen, with the advantages of the diamond fabric. It is explained that in all of these screens the wires are interwoven diagonally to the sides of the screens, producing the strongest construction and preventing displacement or disarrangement of the product. It is pointed out that the position of the wires deflects the material passing over the screen, back and forth, producing a high vibratory or rattling motion, which is not possible in square mesh screens, the effect of which is to greatly increase the screened output. The screens are intended for screening coal, stone, gravel, sand and other heavy materials. The adjustable screens, Fig. 1, are made in four sizes: No. 1, covering ½ to ⅛ in., No. 14 wire; No. 2, ¾ to ⅜ in., No. 12 wire; No. 3, 1½ to 1 in., No. 9 wire, and No. 4, 2¼ to 1½ in., No. 6 wire.

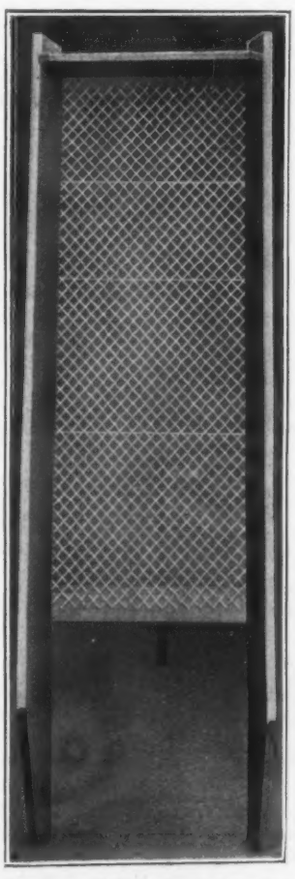


*Fig. 2.—Standard Crimped Diamond Nonadjustable Wooden Frame Screen.*

## Handy Hoist Holder.

Verdin, Kappes & Verdin, Cincinnati, Ohio, are offering the patented handy hoist holder for use with chain hoist or block and tackle. The holder is made of the best crucible steel castings, hand forged links and has a special bolt with full body on which the frame swings. There is a spring for holding the jaws securely to the iron or wooden joist or beam until the weight is suspended. The general construction is of such nature as to cause the jaws to grip together as the load increases. The holders are made in three sizes to attach to joist or

*The Handy Hoist Holder, for Use with Chain Hoist or Block and Tackle.*

beam from 2 in. to 14 in. thick, with capacity from 1500 to 3000 lb. The manufacturers refer to the hoist holder as serviceable for machine shops, steam fitters, elevator builders, electricians, contractors, millwrights, &c.

## The Harkness Portable Door Check.

The Harkness Portable Door Check Company, 184 Summer street, Boston, Mass., is bringing out the Harkness portable door check, which is made of cold rolled

*The Harkness Portable Door Check, Weighing 6 Oz. and small Enough to Carry in the Pocket.*

steel and is strong and durable. Corrugated rubber of first grade is riveted on top and bottom of the check to prevent injury either to door or floor. The device weighs but 6 oz., and is compact enough to carry in the pocket. In use the check is placed on the floor at the point where the door is to be held open. The plunger is then pressed

with the foot as far as it will go, then the door is swung over projection B, the foot removed and the door firmly held. The company states that the check will hold a door securely against even strong wind. Additional features mentioned are that the device is especially valuable in bedroom or sick room, where fresh air currents are often necessary; being portable it can be carried from room to room, taken on pleasure trips, and may be used in office and other buildings.

## The Gliderole Coaster.

The Buffalo Sled Company, 1453-1459 Niagara street, Buffalo, N. Y., is offering the sled on wheels of which top and bottom views are shown. The wooden parts are made from selected white ash, with frame mortised together to make it light and strong. The metal parts are all of pressed steel, formed so as to give the greatest strength. The wheels are fitted within roller bearings, with 9-16 in. rubber tires without joints. Wheels are also made with steel rim. The steering device is referred to as being simple and reliable, and can be operated with the hands, feet or rope. The brake is conveniently located and is positive in action. It is pointed out that the coaster is very simple; that it may be safely handled by any child, and that it is built low and broad so that it cannot be upset easily when turning a corner at even high speed. The coaster is made in one size,

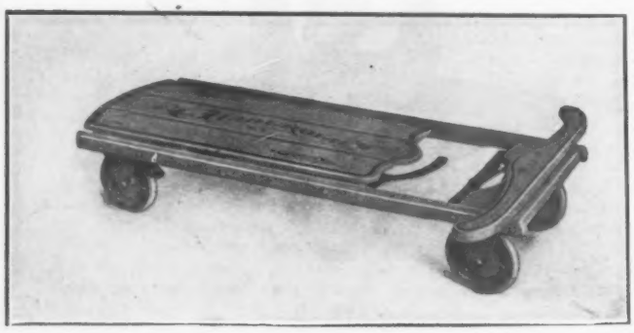


*Fig. 1.—Top View of the Gliderole Coaster.*

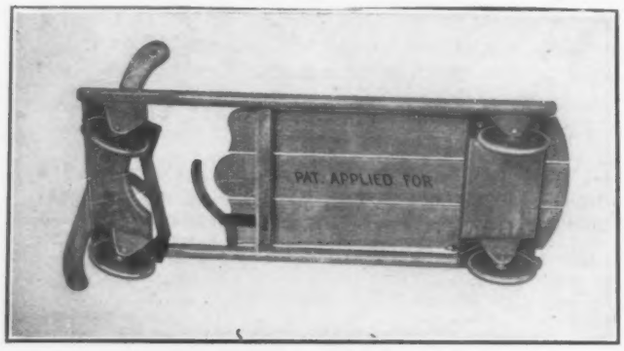



*Fig. 2.—Bottom View of the Gliderole Coaster.*

and is 34 in. long, 13 in. wide, 6 in. high, with wheels 4¾ in. in diameter. Each coaster is packed in a strong corrugated box, sealed tight.

## Sterling Aluminum Enameled Ware.

The Central Stamping Company, 172-174 Fulton street, New York, has much improved the standard of its Sterling aluminum enameled ware, by making it triple coated instead of two-coated, as heretofore. All bails are trimmed with mahogany finished wood handles. All covers are recoated and fitted with the company's well known metal knob, which cannot become detached in use. All holes in ears or for the purpose of hanging are protected by brass rims or eyelets. A new line of two-coat enameled ware called Dresden will take the place of the Sterling line as previously made, being designed for close competition. The Sterling assortment is illustrated and described in a catalogue, No. 30, just issued.

## Enameled Sink Strainer and Commode.

Two new articles incorporated in the extensive line of porcelain enameled sheet steel and cast iron ware made by the Jacob J. Vollrath Mfg. Company, Sheboygan, Wis., are here illustrated. Fig. 1 represents the new seamless sink strainer, which is said to be the first strictly seamless strainer in the market. It is designed to rest firmly in the corner of the sink, upon three substantial legs, and is finished in all white and white and speckled gray enamels to match the sink patterns most commonly used. The commode shown in Fig. 2 is fitted with a sanitary cover having an exceptionally deep flange which

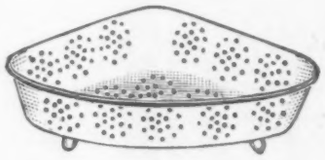


*Fig. 1.—Porcelain Enameled Seamless Sink Strainer.*

*Fig. 2.—Porcelain Enameled Commode Fitted with Sanitary Cover.*

guards it from falling or being shaken off while in use. It is suspended on the bail by a round ear which prevents the bail catching on it or destroying the enamel at that point. While presenting an attractive appearance in all styles of enamel, it is most pleasing in the all white and white and speckled enamels.

## The Kerco Cog and Rack Head.

The accompanying illustrations represent a cog and rack head for use on pumps, manufactured by the Kerrihard Company, Red Oak, Iowa. Attention is directed to the strength of castings in both rack and quadrant, and to the large open teeth to permit a free and frictionless

*Fig. 1.—The Kerco Cog and Rack Head for Use with Common Lift Pumps.*

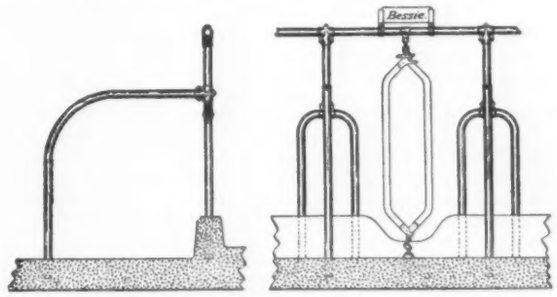
*Fig. 2.—The Kerco Cog and Rack Head as Used on Pump Standards.*

movement. In Fig. 1 a portion of the quadrant covering is cut away to show construction, but is represented intact in Fig. 2. Two loose rollers held by separate retainers allow unrestricted movement of the rack. The rollers simply lay in the ways, and as pressure is brought upon the handle, the rack picks them up and they play up and down, rolling up with the upward movement of the plunger and falling back as the plunger returns. This action is said to be almost without friction. The protection of the parts from the weather allows them to be in constant use without lubrication. The heads are

made so that they may be put on any of the company's pumps, and older models may be readily changed to this style of head. The heads are furnished with slide bars attached for windmills, if desired. It is pointed out that an advantage of the top is a 3-in. fulcrum with a 6-in. stroke, making it powerful. The company especially recommend it for deep wells.

## Louden's Sanitary Cow Stalls and Stanchions.

The Louden Machinery Company, Fairfield, Iowa, is making a line of sanitary stable stalls and stanchions, one pattern of which is shown herewith. The stalls, made of tubular steel rails and concrete, are designed to secure free ventilation and sanitary stabling conditions. Being constructed of steel the stalls are staunch and durable, presenting but little surface for the collection of dirt and filth. The partition, stall guard and supports are made of 2-in. steel pipes, and are easily assembled and installed by using malleable fittings which clamp the pipes securely by means of bolts. The stanchions are provided with convenient fastenings which may be opened and closed with one hand without removing glove or mitten, and are fastened to the manger at both top and bottom by chains of sufficient length to allow the free and natural movement of the animal's head and neck. The stanchions are 3½ ft. long by 7 in. wide inside, although special sizes are made if desired. The stall shown has posts on each side of the stanchion braced by curved supports. When set in cement floors




*Louden's Sanitary Cow Stalls and Stanchions.*

the lower ends of the pipe are flared to insure secure holding, and for attaching to plank floors malleable foot flanges are furnished for bolting to the floor with lag screws.

## PAINTS, OILS AND COLORS

### Animal, Fish and Vegetable Oils—

| | ℔ gal. bbl. lots |
|---|---|
| Linseed, Western, Raw | 56 @57 |
| State, Raw | 56 @57 |
| City, Raw | 57 @58 |
| Boiled, 1¢ ℔ gal. advance on Raw, | |
| Raw, Calcutta, in bbls | 75 @.. |
| Lard, Prime Winter | 95 @.. |
| Extra No. 1 | 57 @58 |
| No. 1 | 48 @50 |
| Cotton-seed, Crude, f.o.b. mill | 4.67@4.75 |
| Summer, Yellow, prime | 5⅝@ 5⅞ |
| Summer, White | 6 @ 6¼ |
| Yellow Winter | 6 @ 6⅜ |
| Tallow Oil, Acidless | 57 @.. |
| Menhaden, Brown, Strained | 29 @.. |
| Northern, Crude | 21 @24 |
| Southern | 22 @24 |
| Light Strained | 29 @.. |
| Bleached Winter | 32 @.. |
| Extra Bleached Winter | 34 @.. |
| Cocoanut, Ceylon | ℔ lb 7⅜@.. |
| Cochin | ℔ lb 8¼@ 8½ |
| Cod, Domestic, Prime | 38 @.. |
| Newfoundland | 40 @42 |
| Red Elaine | 48 @.. |
| Saponified | ℔ lb 6½@.. |
| Olive, Yellow | 1.35@1.40 |
| Neatsfoot, Prime | 58 @.. |
| Palm, Lagos | ℔ lb 5⅞@ 6 |

### Mineral Oils—

| | ℔ gal. |
|---|---|
| Black, 29 gravity, 25@30 cold test | 12½@13 |
| 29 gravity, 15 cold test | @13½ |
| Summer | @12½ |
| Cylinder, light filtered | @20½ |
| Dark, filtered | 17½@18 |
| Paraffine, 903-907 sp. gravity | @14½ |
| 903 sp. gravity | @13½ |
| 883 sp. gravity | 10½@11 |
| Red | @13½ |

### Miscellaneous—

| | |
|---|---|
| Barytes: | |
| White, Foreign | ℔ ton $18.50@20.50 |
| Amer., floated | ℔ ton 17.00@18.00 |
| Off color | ℔ ton 12.50@15.00 |
| Chalk in bulk | ℔ ton 3.00@ 3.40 |
| China Clay, Imported | ℔ ton 11.50@18.00 |
| Cobalt, Oxide | ℔ 100 lb 1.45@ 2.60 |
| Whiting, Commercial | ℔ 100 lb 45@50 |
| Gilders | ℔ 100 lb .52@ .64 |
| Ex. Gilders | ℔ 100 lb .56@ .68 |

### Putty, Commercial—℔ 100 lb

| | |
|---|---|
| In bladders | $1.70@2.00 |
| In bbls. or tubs, 100 lb | 1.30@1.45 |
| In 1 lb to 5 lb tins | 2.65@3.25 |
| In 12½ to 50 lb tins | 1.50@1.90 |

### Spirits Turpentine—℔ gal.

| | |
|---|---|
| In Oil bbls | .60 @60½ |
| In Machine bbls | 60½@61 |

### Glue—

| | ℔ lb |
|---|---|
| Cabinet | 12 @15 |
| Common Bone | 7½@ 9 |
| Extra White | 18 @24 |
| Fish, liquid, 50 gal. bbls., per gallon | .60 @1.20 |
| Foot Stock, White | 12 @14 |
| Foot Stock, Brown | 9 @11 |
| German Common Hide | 10 @12 |
| German Hide | 12 @18 |
| French | 10 @40 |
| Irish | 13 @16 |
| Low Grade | 10 @12 |
| Medium White | 14 @19 |

### Gum Shellac—

| | ℔ lb |
|---|---|
| Bleached, Commercial | 16 @17 |
| Bone Dry | 20 @21 |
| Button | 20 @30 |
| Diamond I | 26 @.. |
| Fine Orange | 20 @21 |
| A. C. Garnet | 18 @18½ |
| Light Orange | 17 @19 |
| Kala Button | 13 @15 |
| D. C. | 25 @26 |
| Octagon B | 22 @23 |
| T. N. | 16½@17 |
| V. S. O. | 24 @25 |

### Colors in Oil—

| | ℔ lb |
|---|---|
| Black, Lampblack | 12 @14 |
| Blue, Chinese | 36 @46 |
| Blue, Prussian | 32 @36 |
| Blue, Ultramarine | 13 @16 |
| Brown, Vandyke | 11 @14 |
| Green, Chrome | 12 @16 |
| Green, Paris | @24 |
| Sienna, Raw | 12 @15 |
| Sienna, Burnt | 12 @15 |
| Umber, Raw | 11 @14 |
| Umber, Burnt | 11 @14 |

### White and Red Lead, &c.—

| | ℔ lb |
|---|---|
| Lead, English white, in Oil | 10½@10¾ |
| Lead, American White: | |
| Dry and in Oil, 100, 250 and 500 lb kegs | 6¾ |
| Dry and in Oil, 25 and 50 lb kegs | 7 |
| Dry and in Oil, 12½ lb kegs | 7¼ |
| In Oil, 25 lb tin pails | 7¼ |
| In Oil, 12½ lb tin pails | 7¾ |
| In Oil, 1, 2, 3 and 5 lb tin cans, ass't | 8¾ |
| Red Lead and Litharge: | |
| In 100 lb kegs | 7 |
| In 25 and 50 lb kegs | 7¼ |
| In 12½ lb kegs | 7½ |
| In lots of less than 500 lbs, ½¢ ℔ lb advance over above prices of White and Red Lead and Litharge. | |
| Lead, American. Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice. | |

### Zinc, Dry—

| | ℔ lb |
|---|---|
| American, dry | 5¼@ 5⅝ |
| Red Seal (French process) | 6¾@ 7 |
| Green Seal | 7¼@ 7½ |
| German Red Seal (French process) | 7¼@ 7⅝ |
| Green Seal | 7⅝@ 8 |
| White Seal | 8¼@ 9 |
| French, Red Seal | 8¾@ 8⅞ |
| Green Seal | 10⅝@10⅞ |

### Dry Colors—

| | ℔ lb |
|---|---|
| Black, Carbon | 5 @10 |
| Black Drop, American | 3½@ 8 |
| Black Drop, English | 5 @15 |
| Black, Ivory | 16 @20 |
| Lamp, commercial | 3 @ 5 |
| Blue, Celestial | 4 @ 6 |
| Blue, Chinese | 30 @31 |
| Blue, Prussian, Domestic | 28 @30 |
| Blue, Ultramarine | 5 @15 |
| Brown, Spanish | ½@ 1 |
| Carmine, No. 40 | 2.65@2.75 |
| Green, Chrome, ordinary | 3½@ 5 |
| Green, Chrome, pure | 17 @25 |

| | ℔ ton |
|---|---|
| Metallic Paint, Brown | $16.50@$22.00 |
| Red | $14.00@$18.00 |

| | |
|---|---|
| Ocher, American | ℔ ton $12.00@15.00 |
| American Golden | 4 @ 5 |
| French | 1¼@ 2 |
| Foreign Golden | 3 @ 4 |
| Orange Mineral, English | 10 @12 |
| French | 12¾@13 |
| German | 12 @13 |
| American | 8½@10 |
| Red, Indian, English | 5 @ 7 |
| American | 3 @ 3½ |
| Red, Turkey, English | 4 @10 |
| Red, Tuscan, English | 7 @10 |
| Red, Venetian, Amer. | ℔ 100 lb $0.75@1.50 |
| English | ℔ 100 lb $1.15@1.60 |
| Sienna, Italian, Burnt and Powdered | 3 @ 9 |
| Italian, Raw, Powdered | 3 @ 7 |
| American, Raw | 2¼@ 3 |
| American Burnt and Pow'd | 2¼@ 3 |
| Talc, French | ℔ ton $18.00@25.00 |
| American | ℔ ton 15.00@25.00 |
| Terra Alba, French | ℔ 100 lb .80@1.00 |
| English | ℔ 100 lb .90@1.00 |
| American | ℔ 100 lb, No. 1, .75@ .80 |
| American | ℔ 100 lb, No. 2, .60@ .65 |
| Umber, Turkey, Bnt. & Pow. | 2¾@ 3 |
| Turkey, Raw and Powdered | 2½@ 3 |
| Burnt, American | 2 @ 2½ |
| Raw, American | 2 @ 2½ |
| Yellow Chrome, Pure | 12¼@13 |
| Oxide Red, American | 2 @ 7¼ |
| Vermilion, English, Imported | @70 |
| Chinese | $0.90@1.00 |


# THE IRON AGE

*The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.*

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# Current Hardware Prices.

**General Goods.**—Goods which are made by more than one manufacturer are printed in *Italics*. The prices named represent those obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers.

**Special Goods.**—Quotations printed in small type (Roman) relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade, lower prices being generally obtainable by the fair retail trade, from manufacturers or jobbers.

**Range of Prices.**—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

**Names of Manufacturers.**—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued annually, a book of 376 pages, which is sent free of charge to every subscriber to *The Iron Age*. It gives a classified list of the products of our advertisers and thus serves as an up-to-date DIRECTORY of the Iron, Hardware and Machinery trades.

**Standard Lists.**—"The Iron Age Standard Hardware Lists," 218 pages, price $2, prepaid, contains the list prices of many leading goods.

**Additions and Corrections.**—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

## Adjusters, Blind—

North's .....10%
Upson's Patent.....25%
Zimmerman's—See Fasteners, Blind.

### Window Stop—

Ives' Patent.....25%
Ives' Stop Bead Screws and Washers .....25%
Taplin's Perfection.....25%

### Anti—Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ℔ doz. pairs, Nos. 1, $0.75; 2, $0.60; 3, $0.65; 4, $1.00; 5, $0.50.
Quick Shifter, ℔ doz. pairs..... $2.00@$3.00
Spitzli Quick Shifter, ℔ doz. pairs .....$1.65@$1.75

### Anvils—American—

Eagle Anvils .....℔ lb @9 ¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton .....℔ lb 9½@9¾¢

### Imported—

Swedish Solid Steel Paragon, ℔ lb .....10@10½¢
Peter Wright & Sons, ℔ lb, 84 to 349 lb, 10½¢; 350 to 600 lb, 11¢.

### Anvil, Vice and Drill—

Millers Falls Co., $18.00.....15&10%

### Augers and Bits—

*Com. Double Spur.....80%*
*Jennings' Patn., Bright.65&10@70%*
*Black Lip or Blued...65@65&5%*
*Boring Mach. Augers.....70%*
*Car Bits, 12-in. twist.....40&10%*
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co.....35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list, 25&7½%
No. 30, R. Jennings' list.....50%
Russell Jennings'.....25&10&2½%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60&10%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Snell's Star Auger Bits.....50&10%
Swan's Auger Bits.....65&10@70%
Swan's, Jennings' Pattern.....50%

### Bit Stock Drills—

See *Drills, Twist.*

### Expansive Bits—

Ford's, Clark's Pattern.....66⅔%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10%
Swan's .....60%

### Gimlet Bits—

*Per gro.*
*Common Dbl. Cut.....$3.00@3.25*
*German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.25*

### Hollow Augers—

*Bonney Pat., per doz..$5.50@6.00*
Ames .....20&10%
Universal .....20%

### Ship Augers and Bits—

*Ship Augers.....40&10@50%*
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's .....6%
Watrous' .....33⅓&7½%
Snell's .....50%

### Awls—

Elmore Tool Mfg. Co.:
Tinners' and Brad Awls.....55&7%
Scratch Awls.....60%

### Axes—

*Single Bit, base weights: Per doz.*
*First Quality.....$4.75@5.00*
*Second Quality.....$4.25@4.50*
*Double Bit, base weights:*
*First Quality.....$7.00@7.50*
*Second Quality.....$6.50@6.75*

### Axles— *Iron or Steel.*

*Concord, Loose Collar...4¼@4½¢*
*Concord, Solid Collar....4½@5 ¢*
*No. 1 Common, Loose...3½@4 ¢*
*No. 1½ Com., New Style.4¼@4¾¢*
*No. 2 Solid Collar.....4¼@4¾¢*
*Half Patent:*
*Nos. 7, 8, 11 and 12.....70%*
*Nos. 13 to 14.....70%*
*Nos. 15 to 18...70&10@70&10&5%*
*Nos. 19 to 22...70&10@70&10&5%*

### Boxes, Axles—

*Common and Concord, not turned .....lb., 5@6¢*
*Common and Concord, turned, lb., 6@7¢*
*Half Patent.....lb., 9½@10¢*

## Bait— Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

### Balances— Sash—

Caldwell new list.....50&10%
Pullman .....50&10%

### Spring—

*Light Spring Balances.50&10@60%*
Chatillon's:
Light Spg. Balances.....50&10@60%
Straight Balances.....40&10@50%
Circular Balances.....50&10@60%
Large Dial.....30@30&10%

### Barb Wire—See *Wire, Barb.*

### Bars— Crow—

*Steel Crowbars, 10 to 40 lb.... per lb., 2¼@—¢*

### Prying and Pinch—

Elmore Tool Mfg. Co.....75%

### Towel—

No. 10 Ideal, Nickel Plate..℔ gro. $8.50

### Beams, Scale—

*Scale Beams.....40@40&10%*
Chattillon's No. 1.....30%
Chatillon's No. 2.....40%

### Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz. $0.80; Tinned .....$0.85
No. 11 Wire Coppered ℔ doz. $1.15; Tinned .....$1.20
No. 10 Wire Tinned.....℔ doz. $1.50

### Beaters Egg—

Dover Stamping & Mfg. Co.:
Genuine Dover, per gro., No. 1, Tumbler Size, $7.50; No. 2, Family Size, $7.50; No. 3, Extra Family Size, $24.00; No. 4, Hotel Size, $30.00.
Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd. $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.

### Bellows—

*Blacksmith, Standard List:*
*Split Leather.....60@60&10%*
*Grain Leather.....50@50&10%*

### Hand—

| *Inch..* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|
| *Doz..* | *$4.50* | *5.50* | *6.00* | *7.00* | *7.50* |

### Molders—

| *Inch..* | *10* | *12* | *14* | *16* |
|---|---|---|---|---|
| *Doz..* | *$8.50* | *11.00* | *13.50* | *14.50* |

Net Prices.

### Bells— Cow—

*Wrought Cow Bells.....75%*
Jersey .....75&10%
Texas Star.....50%

### Door—

Reading Hardware Co.....50%
Home, R. & E. Mfg. Co.'s.....55&10%

### Hand—

*Polished, Brass.....60@60&10%*
*White Metal.....60@60&10%*
*Nickel Plated.....50&10%*
*Swiss .....50&10%*

### Miscellaneous—

*Farm Bells.....lb., 2½@3¢*
*Church and School....60@60&5%*

### Belting— Leather—

*First Quality, Ex. Hy., Strictly Short Lap.....60&10%*
*Standard .....70&10@70&10&5%*
*Light Double.....75&10%*
*Cut Leather Lacing.....45@50%*
*Leather Lacing Sides, per sq. ft.25¢*

### Rubber—

*Competition (Low Grade), 70&10@75%*
*Standard .....60&10@70%*
*Best Grades.....50@50&10%*

### Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters .....20%

### Bicycle Goods—

John S. Leng's Son & Co.'s 1909 list:
Chain, Parts, Spokes.....50%
Tubes .....60%

### Blocks Tackle—

*Common Wooden.....75@75&10%*
Lane's Patent Automatic Lock and Junior .....30%
See also Machines, Hoisting.

### Boards, Stove—

*Paper and Wood Lined.50&10@60%*
*Embossed .....50&10@60%*

### Bobs, Plumb—

Keuffel & Esser Co.....33⅓&10%

### Bolts Carriage, Machine, &c.—

*Common Carriage (cut thread):*
*⅜ x 6 and smaller.70&12½@—%*
*Larger and longer..65&10@—%*
*Common Carriage (rolled thread):*
*⅜ x 6, smaller and shorter, 75@—%*
*Phila. Eagle, $3.00 list...80@—%*
*Bolt Ends, with C. & T. Nuts, 65&10@—%*
*Machine (Cut Thread):*
*⅜ x 4 and smaller....75@—%*
*Larger and longer.....70@—%*

### Door and Shutter—

*Wrought Iron:*
*Wrought Barrel Japanned. 80&10&10@85%*
*Barrel Bronzed.....60&10@70%*
*Spring .....70&10&10@80%*
*Square Neck.....75&10@80%*
*Square .....80@80&10%*
Ives' Mortise Door.....25%
Ives' Wrought Door.....25%

### Expansion—

F. H. Evans' Crescent.....40@60%
Richards Mfg. Co.....55&10%
Star Expansion Bolt Co.:
Star, Lag Screw Type..60&10&5&2½%
Star, Wood Screw Type.....40%
Star, Machine, Single Wedge.....60%
Star, Machine, Double Wedge.60&10%
Star Toggle Bolts.....60%
Steward & Romain Mfg. Co.:
Style No. 13, Double.....60&10%
Style No. 1, Single.....60&10%
Style No. 100, Dbl. Jaw, Single..55%
Lag Screw.....66⅔%
Star Screw Anchors, Hollow.....40%

### Plow and Stove—

*Plow .....65&5@70%*
*Stove .....85&5@85&10%*

### Tire—

*Common Iron.....80%*
*Norway Iron.....80%*
American Screw Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct. '84.....80%
Eagle .....82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99....80%
Phila., Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts.....80%

### Borers, Bung—

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

### Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%

### Braces—

*Common Ball.....$1.50@$1.75*
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 61, 166, 206, 614.....50%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....40%
Mayhew's Quick Action Hay Patent .....40&10%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat Revised List.....60@60&5%

### Brackets—

*Wrought Steel.....80@80&5%*
Griffin's Pressed Steel.....75@75&10%
Griffin's Folding Brackets.....70&10%
Stanley's Pressed Steel.....75&10&5%
Stanley's Folding Brackets..70&10&5%
Taplin Victor Handy Egg Beater Bracket .....℔ doz. $1.50

### Broilers—

Kilbourne Mfg. Co.....75&20%
Wire Goods Co.....75&10%

### Butts— Brass—

*Wrought .....65%*
**Cast Brass, Tiebout's.....40&10%**

### Wrought Steel—

*BRIGHT.*
*Light Narrow, Light Reversible .....75&5%*
*Reversible and Broad.75&10%*
*Loose Joint, Narrow, Light Inside Blind, &c.....75%*
*Back Flaps, Table Chest.70%*
*BRONZED.*
*Light Narrow, Loose Pin..55%*
*Light, Loose Pin, Ball Tip.65%*
*Broad .....55%*

Extra, 5@—

## Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 900 .....30%
Hendryx Bronze: Series 700, 800.....30%
Hendryx Enameled.....35%

### Calks, Toe and Heel—

*Blunt, 1 prong, per 100 lb., $3.50@$3.85*
*Sharp, 1 prong, per 100 lb., $4.00@$4.35*

Burke's, 1 pg. Blunt Toe, 3¾¢; 2 pg. Blunt Toe, 4¼¢; 1 pg. Sharp Toe, 4¼¢; 2 pg. Sharp, 4¾¢; Blunt Heel, 4¼¢; Sharp Heel.....4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

### Caps— Primers—

*Berdan Primers, $2 per M.20&5%*
*Primer Shells and Bullets..15&10%*
*All other primers per M.$1.52@1.60*

### Cartridges—

*Blank Cartridges:*
*32 C. F., $5.50.....10&5%*
*38 C. F., $7.00.....10&5%*
*22 cal. Rim, $1.50.....10&5%*
*32 cal. Rim, $2.75.....10&5%*
*B. B. Caps, Con. Ball, Swgd.$1.90*
*B. B. Caps, Round Ball.....$1.40*
*Central Fire.....25%*
*Target and Sporting Rifle.15&5%*
*Primed Shells and Bullets.15&10%*
*Rim Fire, Sporting.....50%*
*Rim Fire, Military.....15&5%*

### Casters—

*Bed .....65&10@70%*
*Plate .....60@60&10%*
*Philadelphia .....70&10@75%*
Gem (Roller Bearing).....70&10&10&5%
Steel Gem (Roller Bearing).....70%
Standard Ball Bearing.....45%
Yale (Double Wheel) low list...40&10%

### Chain, Proof Coil—

*American Coil, Straight Link:*

| 3-16 | ¼ | 5-16 | ⅜ | ½ | ⅝ |
|---|---|---|---|---|---|
| $7.45 | 4.80 | 3.85 | 3.25 | 3.10 | 3.00 |

¾-⅞-1. 1⅛ to 1¼ inch.
$2.90 3.00

*German Coil.....70&5%*
*German Pattern Coil:*
*6-0 to 1.....70&10&5%*
*2 and 3.....60&10&10@70%*
*4, 5 and 6.....50&10@50&10&5%*

### Halter—

*Halter Chains.....60&5@60&10%*
*German Pattern Halter Chains, list July 24, '97.....70&5%*
Covert Mfg. Co.:
Halter .....30&10&10%

### Trace, Wagon, &c.-

*Traces, Western Standard: 100 pr.*
*6½—6-3, Straight, with ring.$26.00*
*6½—6-2, Straight, with ring.$27.00*
*5½—8-2, Straight, with ring.$30.00*
*6½—10-2, Str'ght, with ring.$35.00*
*NOTE.—Add 2c per pair for Hooks Twist Traces: add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.*
*Eastern Standard Traces, Wagon Chain, &c.....70&10@—%*

### Miscellaneous—

*Jack Chain:*
*Iron .....60&10&10@70%*
*Brass .....60&10&10@70%*
*Safety and Plumbers' Chain..75%*
*Gal. Pump Chain....lb., 4½@5%*
Bridgeport Chain Co.:
Triumph Halter and Coil.35&2½@40%
Triumph Dog.....50&10@60%
Brown Halter and Coil.....45@50&5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion, Post.....30&10&10%
Oneida Community:
American Halter, Dog and Kennel Chains .....35&2½@40%
Niagara Dog Leads and Kennel Chains .....45@50&5%
Wire Goods Co.:
Dog Chain.....70%
Universal Dbl.-Jointed Chain..50&10%

### Chain and Ribbon, Sash—

Oneida Community:
Steel Chain.....60%
Pullman:
Bronze Chain, 60%; Steel Chain, Coppered .....60&10%
Sash Chain Attachments, per set.88¢
Aluminoy Sash Ribbon, per 100 ft. .....$2.00@$5.00
Sash Ribbon Attachments, per set..8¢

### Chalk—

*Carpenters' Blue....gro., 50@55¢*
*Carpenters' Red.....gro., 50@55¢*
*Carpenters' White...gro., 40@45¢*

### Checks, Door—

Bardsley's .....33⅓%
Reading, Ogden.....20&5%
Pullman, per gro.....$54.00
Russwin .....33⅓%

### Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters, etc., Chests, with Tools .....20%
Machinists' and Pipe Fitters' Chests, Empty.....45%
Tool Cabinets.....45%
E. Jennings & Co.'s Machinists' Tool Chests.....7½%

### Chisels—

### Socket Framing and Firmer

*Standard List..80&10@80&10&10%*
Buck Bros.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25&7½%
Socket Framing No. 15.....25&7½%
R. & E. Mfg. Co.....70@70&10%
Swan's .....66⅔@70%
L. & I. J. White & Co.....30@30&5%

### Tanged—

*Tanged Firmers.....35&10@40%*
Buck Bros.....30%
C. E. Jennings & Co. Nos. 191, 181, 25%
R. & E. Mfg. Co.....25@30&5%
L. & I. J. White Co.....25&5%

### Box—

Elmore Tool Mfg. Co.....50%

### Cold— lb.

*Cold Chisels, good quality..13@15¢*
*Cold Chisels, fair quality..11@12¢*
*Cold Chisels, ordinary.....9@10¢*
Elmore Tool Mfg. Co.:
Cold Chisels.....50&5%

### Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat. each $8.00.....35&5%
Cincinnati Chuck Co.:
Independent 4-jaw Reversible.....35%
Jacobs' Drill Chucks.....35%
Skinner Lathe Chucks:
Independent .....35%
Universal, Reversible Jaws.....35%
Universal, Com. Style Jaws.....40%
Combination, Reversible Jaws.....35%
Combination, Com. Style Jaws...40%
Round Body or Box Body, 2 Chuck Jaws .....25%
Geared Scroll Chucks.....25%
Drill Chucks:
New Model, 25%; Geared Pattern, 25%; Skinner Patent, ...25%
Positive Drive.....40%
Planer Chucks.....20%
Standard .....45%
Drill Press Vises.....30%
Face Plate Jaws.....35%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combinations, Nos. 83 and 84 .....30%
Geared Scroll, Nos. 33, 34 and 35..25%
Independent Iron, Nos. 18 and 318.35%
Independent Steel, No. 64.....25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35%
Union Czar Drill.....25%
Union Geared Drill Chuck.....25%
Universal, 11, 12, 16, 17, 13, 14, 15..40%
Universal No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and 72 .....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill...50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

### Clamps—

Carriage Makers', Star, P., S. & W. Co. .....50@50&5%
Besly, Parallel.....33⅓&10%
Hammer & Co.:
Adjustable .....20&5%
Carriage Makers' H. P. Screw.40&5%
Myers', Standard and Wenzelmann Hay Rack.....50%
Saw Clamps, see Vises, Saw Filers'.

### Cleaners, Drain,

Iwan's Champion, Adjustable..... 50%
Iwan's Champion, Stationary....40&5%

### Cleavers, Butchers'—

Foster Bros.....30%
L. & I. J. White Co.....30%

### Clippers, Horse and Sheep—

Chicago Flexible Shaft Co.:
1902 Chicago Horse, each...$10.75
20th Century Horse, each...$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each..$20.00
Stewart's Enclosed Gear Ball Bearing Horse, each.....$7.50
Stewart's New Model Sheep Shearing Machine, each.$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} 25%

### Clips, Axle—

*Regular Styles.....80&80&10%*

### Cocks, Brass—

*Hardware list:*
*Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c .....75%*
*Compression Bibbs.....75%*

### Compasses, Dividers, &c.

*Ordinary Goods.....75@75&5%*

### Conductor Pipe,—

*All territories, L. C. L.*
*Galvanized Steel...75&10&5@—%*
*Charcoal .....50&10&7½@—%*
*Copper .....50&10@—%*

*Terms, 60 days: 2% cash 10 days. Factory shipments generally delivered.*
See also Eave Troughs.

### Coolers, Water—

L. & G. Mfg. Co..

| Galvanized, Lined, side handles, Gal.... | 2 | 3 | 4 | 6 | 8 |
|---|---|---|---|---|---|
| Each | $1.30 | 1.60 | 2.00 | 2.30 | 3.00 |
| White Enameled Lined, Side Handles: Gal.... | 2 | 3 | 4 | 6 | 8 |
| Each | $2.40 | 2.80 | 3.50 | 4.50 | 5.60 |
| Agate Lined, Side Handles: Gal.... | 2 | 3 | 4 | 6 | 8 |
| Each | $3.00 | 3.40 | 4.30 | 5.30 | 6.60 |

10%

### Coppers, Soldering—

*Soldering Coppers, 3 lb. to pair and heavier, 21¢; lighter than 3 lb. to pair.....23¢*

### Cord— Sash—

*Braided, Drab.....lb. 35¢*
*Braided, White, Com., Nos. 8 to 12, 25¢; No. 7, 25½¢; No. 6, 26½¢.*
*Cable Laid Italian, lb., No. 18.37¢*
*Italian, lb., A, No. 18, 25¢; B, 22¢*
*Common India.....lb., 11@11½¢*
*Cotton Sash Cord, Tw'ted..18@20¢*
*Patent Russia.....lb....20¢*
*Cable Laid Russia.....lb...21¢*
*India Hemp, Br'd'd.....lb...21¢*
*India Hemp, Twisted...lb..13@14¢*
*Patent India, Twisted ..lb...17¢*
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to10.....℔ lb 23¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per 100..$2.00
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White...℔ lb 40¢
Massachusetts, Drab...℔ lb 45¢
Phoenix, White, Nos 8 to 12....27¢
} 15%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

### Wire, Picture—

*Full Length.....90@—%*
*Short Length.....90&20@—%*
Hendryx Standard Wire Picture Cord. 90&10%
Turner & Stanton Co. Wire Picture Cord .....90&10%

### Cradles—

*Grain .....50%*

### Crayons—

*White Round Crayons, Cases, 100 gro., $8.00, $8.50, $9.00 and $10.00 according to grade.*
Zelnicker's Lumber: ℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks.....$10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00
Suremark, Black, $2.25; Blue, Red and Yellow.....$2.50

### Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847.℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....℔ doz. $3.00
Wm. Rogers & Son.....℔ doz. $2.50

### Cutters— Glass—

H. H. Mayhew Co.....40&5%

### Meat and Food—

Enterprise:

| Nos.. | 5 | 10 | 12 | 22 | 32 |
|---|---|---|---|---|---|
| Each | $1.75 | $2.50 | $2.25 | $4 | $5 |

25@25&7½%
No. 202, $1.50.....40&7½%
P., S. & W. Co.:
Ideal .....40@40&5%
Hales .....60&5%
Little Giant.....℔ doz. 40@50%
Nos.. 305 310 312 320 322
$35.00 $48.00 $44.00 $72.00 $68.00
New Triumph No. 605, ℔ doz. $24.00.
Russwin Food, No. 1, $24.00; No. 2, $27.00; 3, $42.00.....65&10&10%
$15.00 $18.00

### Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater .....℔ doz. $4.00

### Tobacco—

Enterprise .....25@30%

## Diggers, Post Hole, &c—

Disston's:
Rapid, ℔ doz., $24.00.....25%
Samson, ℔ doz., $34.00.....25%
Iwan's Pat. Post Hole and Well Auger .....40%
Vaughan Pattern Post Hole Augers, 4 to 9 in., ℔ doz.....$6.25
Perfection Post Hole Diggers, ℔ doz. .....$8.25
Split Handle Post Hole Diggers, ℔ doz., $7.25
Hercules Pattern, ℔ doz.....$8.75
Kohler's, ℔ doz., Universal, $14.00; Little Giant, $12.00; Genuine Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer.....$7.50
Never-Break Crucible Steel Post Hole Diggers .....60%

### Dressers Emery Wheel—

Sterling Emery Wheel Dressers.....33⅓%
Sterling Wheel Dresser Cutters.....35%

### Drills and Drill Stocks—

*Blacksmith's Common Drilling Machines .....$1.50@1.75*
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....30&10%
C. & C. Ratchet.....25%
Reversible Ratchet Die Stocks....25%
Forbes Die Stocks.....5%
Goodell Automatic Drills.50&10&10&10%
Millers Falls Automatic Drills, Graves', per doz., Nos. 1, $4.86; 2, $8.16.
Millers Falls Automatic Drills,33⅓&10%
Noyes Repair Shop Drill No, 10.....20%
Ratchet, Parker's.....40%
Ratchet, Weston's, Styles A and B.50%
Ratchet, Weston's, Styles C, D and F .....45%
Ratchet, Weston's, Style H Improved .....45%
Ratchet, No. 012.....50%
Ratchet, Celebrated.....50%
Ratchet, Whitney's, P., S. & W..50%
Star Drills.....60%
Star Pipe Drills.....50&10%
Sebco Extension Drills.....40&10&5%
Star Drill Holders.....50&10&10%
Star Drill Points.....50&10&10%

### Twist Drills—

*Bit Stock.....70@70&10%*
*Taper and Straight Shank. 65@65&10%*

### Drivers, Screw—

Buck Bros.' Screw Driver Bits.....30%
Disston's Screw Drivers, Handles and Ferrules .....70%
Elmore Tool Mfg. Co.:
Elmore .....60%
Hartford .....66⅔%
Indestructible .....55&7½%
Standard Neverturn.....66⅔%
Star .....75&5%
Screw Driver Bits.....25%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65@65&10%
Mayhew's Black Handle.....45%
Mayhew's Monarch.....45%
Millers Falls, ℔ doz., Nos. 11, $9.95; 12, $13.73; 20, $8.17; 21, $8.46; 41, $13.43; 42, $17.21.
Swan's:
Nos. 7565 to 7568, 60%; No. 7540, 40&10%

## Eave Trough, Galvanized—

*All territories.*
*Galvanized Steel...80&10&10@—%*
*Copper .....50&10@—%*

*Terms,—2% for cash. Factory shipments generally delivered.*
See also Conductor Pipe and Elbows.

### Elbows and Shoes—

*Factory shipments, all territories: Galv. Steel, Galv. C. I. and Copper.*
*Sizes 2, 3, 4.....80%*
*Sizes 1½, 2½, 3½, 5, 6...60&10%*
*No. 26.....50%*
*No. 24.....25%*
*Copper Elbows.....50%*

### Emery, Turkish—

| | 4 to 46: | 54 to 220: | Flour. |
|---|---|---|---|
| *Kegs .....lb.* | *5 ¢* | *5½¢* | *3½¢* |
| *½ Kegs.....lb.* | *5¼¢* | *5¾¢* | *3¾¢* |
| *¼ Kegs.....lb.* | *5½¢* | *6 ¢* | *4 ¢* |
| *10-lb. cans, 10 in case....* | *6¼¢* | *7 ¢* | *6 ¢* |
| *10-lb. cans, less than 10.....* | *10 ¢* | *10 ¢* | *8 ¢* |
| *Less quantity..* | *10 ¢* | *10 ¢* | *8 ¢* |

*NOTE.—In lots 1 to 3 tons a discount of 10% is given.*

### Extensions, Bit—

Ford's Auger Bit Extensions....40&5%

### Extinguishers—Fire

Royal Mfg. Co. Fire, ℔ doz., $12.00 .....50

## Fasteners, Blind—

Upson's Patent.....25%
Walling's .....50%
Zimmerman's Jap'd and Galv., 65%; Bronze and Plated.....50%

### Cord and Weight—

Ives, ℔ gro., $1.08.....25%
Titan, ℔ gro., $0.66.....25%

### Corrugated—

Acme Corrugated Fasteners.....70%

### Faucets—

*Cork Lined.....50&10@60%*
*Metallic Key, Leather Lined, .. 60&10@70%*
*Red Cedar.....40&5@40&10@45%*
*Petroleum .....70&10@75%*
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I.X.L. Cork Lined..50%
John Sommer's Reliable Cork Lined.. 50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined...50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
Self Measuring:
Enterprise, Self Measuring and Pump, ₱ doz., $36.00.....40&10%
Lane's, ₱ doz., $36.00.....40&10%

### Files— Domestic—

*Best Brands.....70&10@75&10%*
*Standard Brands.....75&10@80%*
*Lower Grade....75&10&10@80&10%*
Disston's Superfine.....60%
Fitchburg .....80%
Heller Bros.....70&10@75&10%
Liveright Bros., Gold Medal.....70%
McCaffrey's American Standard, 60&10&10%
McCaffrey's Swiss Pattern.....45&10%
Simonds .....70%

### Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 101 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

### Grindstone—

*Net Prices:*

| | | | | |
|---|---|---|---|---|
| *Inch* | *15* | *17* | *19* | *21* |
| *Per doz.* | *$3.00* | *3.25* | *3.55* | *4.00* |

Peck, Stow & Wilcox Co.:

| In. | 15 | 17 | 19 | 21 | 24 |
|---|---|---|---|---|---|
| | $4.00 | 4.40 | 4.75 | 5.50 | 6.50 |

....20%
Reading Hardware Co.....50&10%

### Frames— Wood Saw—

*White, S'g't Bar, per doz.80@$1.00*
*Red, S'g't Bar, per doz.$1.00@1.25*
*Red, Dbl. Brace, per doz.$1.40@1.50*

### Freezers, Ice Cream—

| *Qt.* | *1* | *2* | *3* | *4* | *6* |
|---|---|---|---|---|---|
| *Each* | *$1.25* | *$1.60* | *$1.90* | *$2.20* | *$2.80* |

### Fuse— *Per 1000 Feet.*

*Hemp .....$2.75*
*Cotton .....3.20*
*Waterproof Sgl. Taped..3.65*
*Waterproof Dbl. Taped..4.40*
*Waterproof Tpl. Taped..5.15*
*10&5%*

### Gates, Molasses and Oil—

*Stebbins' Pattern.....80@80&5%*

### Gauges—

*Marking, Mortise, &c..50@50&10%*
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Disston's Marking, Mortise, &c..60&10%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....25%

### Gimlets— Single Cut—

*Numbered assortments, per gro.*
*Nail, Metal, No. 1, $2.00; 2, $2.30*
*Spike, Metal, No. 1, $4.00; 2, $4.30*
*Nail, Wood Handled, No. 1, $2.50; 2, $2.60*
*Spike, Wood Handled, No. 1, $4.30; 2, $4.60*

### Glasses, Level—

Chapin-Stephens Co.....65@65&10%
Disston & Sons.....60&10%

### Glue, Liquid Fish—

*Bottles or Cans, with Brush, 25&10@50%*

### Grease, Axle—

*Common Grade...gro.$6.00@$6.50*
Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, ₱ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

### Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

### Grinders—

Pike Mfg. Co.:
Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power).33⅓%
Mower Knife and Tool, $5.00..40&10%
Royal Mfg. Co.:
Hand Power, each, Nos. 01, $1.75; 02, $2.25; 1A, $2.50; 1B $3.25....33⅓%
Foot Power, No. 10, $5.00.....33⅓%
Encased Gears, No. 15, Hand Power, $13.50; Combined Hand and Foot Power, $15.00.....33⅓%
Lawn Mower Grinder, No. 40, $3.75 .....33⅓%
Sickle Grinder, each, No. 20, $5.00 .....33⅓%
Cast or Cut Gears.

### Grindstones—

Pike Mfg. Co.:
Improved Family Grindstones, ₱ inch, ₱ doz., $2.00.....33⅓%
Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted.....40%

### Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

## Halters and Ties—

*Cow Ties.....70&10@—%*
Bridgeport Chain Co.:
Triumph Coil and Halters,35&2½@40%
Brown Coil and Halters...45@50&5%
Brown Cow Ties.....50&5@50&10&5%
Brown Tie Outs.....70&10@75&5%
Covert Mfg. Co.:
Web .....30&10%
Jute Rope.....55%
Sisal Rope.....45%
Cotton Rope.....55%
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters...45@50&5%
Niagara Cow Ties.....45&5@50&10&5%

### Hammers—

### Handled Hammers—

Heller's Machinists'..65&10@65&10&10%
Heller's Farriers'.....40@40&10%
Peck, Stow & Wilcox Co.:
Crucible Steel.....50%
Farriers' .....50%
Riveting .....50%
Machinists' .....50%
Blacksmiths' .....50%
Elmore Shoemakers' Hammers.....75%
Victor Magnetic Tack, ₱ gro....$7.75

### Heavy Hammers and Sledges—

*Under 3 lb., per lb., 50¢...80&10%*
*3 to 5 lb., per lb., 40¢...80&10&10%*
*Over 5 lb., per lb., 30¢.80&10&10%*

### Handles—

### Agricultural Tool Handles

*Axe, Pick, &c....60&10@60&10&5%*
*Hoe, Rake, &c.....40%*
*Fork, Shovel, Spade, &c.:*
*Long Handles.....40%*
*D Handles.....40%*

### Cross-Cut Saw Handles—

Atkins' .....35%
Disston's Handles and Saw Tabs..45%

### Mechanics' Tool Handles—

*Auger, assorted...gro.$3.00@$3.50*
*Brad Awl.....gro.$1.65@$1.75*
*Chisel Handles, Ass'd, per gro.:*
*Tanged Firmer, Apple, $2.40@ $2.65; Hickory.....$2.15@2.40*
*Socket Firming, Apple, $1.75@ $1.95; Hickory.....1.60@1.75*
*Socket Framing, Hickory, $1.60@$1.75*
*File, assorted.....gro.$1.30@$1.40*
*Hammer, Hatchet, &c. 60&10@60&10&5%*
*Hand Saw, Varnished, doz., 80¢ 85¢; Not Varnished.....65@75¢*
*Plane Handles:*
*Jack, doz., 30¢; Fore, doz...45¢*
Chapin-Stephens Co.:
Carving Tool.....30@30&10%
Chisel .....60@60&10%
File and Awl.....60@60&10%
Saw and Plane.....30@30&10%
Screw Driver.....30@30&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle .... ₱ gro. $0.85@$1.50
J. L. Osgood:
Indestructible File and Tool, ₱ gro., No. 1, $8.00; No. 2, $8.50; No. 3, $9.00; No. 4, $9.50; No. 5, $10.00.....gro. lots 10%
W. A. Zelnicker Supply Co.:
Hammer, ₱ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 in., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ₱ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe, ₱ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ₱ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ₱ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ₱ doz., 12 to 14 in., $2.00.
*Extra 5@10% often given.*

### Hangers—

*NOTE.—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, &c.*

Chicago Spring Butt Co.:
Friction .....25%
Oscillating .....25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator .....30%
Railroad .....50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00..60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy., No. 22, $18.00.....60&10%
Bull Dog, $24.00.....70%
Lane Bros. Co.:
**Parlor, Ball Bearing, $4.00:**
Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion per set of 4 Hangers, complete with track.....$2.25
Barn Door, Standard.....60&10%
Hinged .....net $6.08
Covered .....60&5%
Special .....70&5%
Trolley Hangers and track...50%
Lawrence Bros.:
Cleveland .....70&7½%
Clipper, No. 75.....60%
Crown .....55&10%
Cyclone, No. 40.....net $6.50
Tandem, No. 50.....net $7.50
New York.....55&10%
Trolley, No. 30, ₱ pair.....$1.25
McKinney Mfg. Co.:
**Roller Bearing, Nos. 1 and 2.70%**
Anti-Friction .....60%
Hinged Hangers, King Charm.60%
F. E. Myers & Bro. Stayon; O K; O K Adjustable; Sure Grip; Sure Grip Adjustable; Sure Grip Tandem; Sure Grip Tandem Adjustable; Tandem Adjustable; Tandem Adjustable .....60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13,$2.50
Roller B'r'g, Nos. 39, 41, 43, 75&7½%
Hero, Adj. Track No. 19...50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..50&5%
Trolley B. D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 44..2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B. D. No. 29.....50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2.75&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3 .....60%
Hinged Tandem No. 48....60&5%
Folding Door B. B, Swivel No. 135 .....40%

### Hangers— Garment—

Pullman Trouser, ₱ gro., No. 1 $9.00; No. 4, $21.00; No. 5, $16.50; No. 6, Black Enamel, $7.50; No. 10, $21.00; No. 12, $8.00; No. 15, Rods, $9.00; No. 18, Loops.....$10.00
Victor Folding.....₱ gro. $9.60

### Joist and Timber—

Lane Bros. Co.....35%

### Hasps—

Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ₱ doz..60%

### Hatchets—

*Regular list, first qual.50&10@60%*
*Second quality.....60@60&10%*

### Heaters, Carriage—

Clark, No. 5, $1.25; No. 5B, $1.50; No. 3, $1.75; No. 3D, $2.00; No. 1, $3.00 .....25%
Big Hit Assortment, ₱ case....$13.80
Leader, ₱ case.....$9.00
Clark Coal, doz.....$0.75
A B C Coal, doz.....$0.60
Sadiron Coal, box 50 pieces.....$0.75

### Hinges—

### Blind and Shutter Hinges

*Surface Gravity Locking Blind: Doz. Sets with Fastenings, No. 1, $0.70; No. 2, $1.25; No. 5, ₱ gr. $5.*
*Mortise Shutter.....80%*
*Mortise Reversible Shutter...80%*
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3 for Brick, $11.30.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.
Hale & Benjamin Automatic Blind Hinges .....20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....50&10%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ₱ doz. sets, without screws, $1.00; with screws, $1.30.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Shepard's Noiseless, Nos. 60, 65, 85 .....75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&5%
Clark's O, P., No. 1.....75&10%
Clark's O, P., Nos. 3 and 5....75&5%
Tip Pattern, No. 1.....75&10%
Clark's No. 3.....75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....70&10&5%
Shepard's Double Locking.....75%
Champion Gravity Locking....75&5%
Pioneer .....75&10%
Empire .....65%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60&10%

### Gate Hinges—

*Clark's or Shepard's—Doz. sets:*

| *No.* | *1* | *2* | *3* |
|---|---|---|---|
| *Hinges with L'tches* | *$2.00* | *2.30* | *3.00* |
| *Hinges only* | *1.25* | *1.90* | *3.00* |
| *Latches only* | *.70* | *.75* | *.75* |

*New England:*
*With Latch.....doz..@$2.00*
*Without Latch.....doz..@$1.00*
*Reversible Self-Closing:*
*With Latch.....doz..@$1.75*
*Without Latch...doz. ...@$1.50*
*Western:*
*With Latch..... doz. $1.75*
*Without Latch.....doz..$1.15*
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3.....70%

### Miscellaneous—

Griffin Mfg. Co., Fleur de Lis Surface Hinges, ₱ doz. prs.....$1.00

### Pivot Hinges—

Bommer Bros. Pivot, Ball Bearing .....40%
Lawson Mfg. Co., Matchless..50&10%

### Spring Hinges—

*Holdback, Cast Iron...$6.75@$7.00*
*Non-Holdback, C'st Iron$6.50@$6.75*
J. Bardsley:
Simplex Spring Hinges.....40%
Bardsley's Patent Checking.33⅓%
Bommer Bros.:
Spring Butt Hinges.....40%
Surface Floor, Ball Bearing .....40%
Mortise Floor, Ball Bearing.40%
Lavatory Hinges.....40%
Non-Holdback Screen Door, Nos. 2000 and 900.....40%
Holdback Screen Door, No. 999.....₱ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triplex Spring Hinges.....50%
Chicago (Ball Bearing) Floor.50%
Chicago Engine House.....25%
Lavatory Door Hinges.....50%
Adjustable Screen Door.....60%
Non-Holdback .....65%
Lawson Mfg. Co.:
Matchless Spring Hinges.....30&10&10%
Matchless Jamb Hinges.....30&10&10%
Lavatory .....50&10%
Surface Floor.....60&10%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges .....40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....₱ gr. $9.00
Chief Ball Bearings Floor Hinge .....50%
Ball Bearing Door.....25%
No. 777, Sheet Steel Holdb'k, ₱ gr. pr.....$9.00
Superior Spring Hinge Co.:
Superior Floor Hinges.....40%
Spring Hinges.....40%
*Extra 10% often given on most of these Hinges.*

### Wrought Iron Hinges—

*Strap and T Hinges, &c.:*
*Light Strap Hinges....65%*
*Heavy Strap Hinges....75%*
*Light T Hinges.....60%*
*Heavy T Hinges....40&10%*
*Extra Hvy. T Hinges.65&10%*
*Hinge Hasps.....40%*
*Cor. Heavy Strap.....75%*
*Cor. Ex. Heavy T...65&10%*
*Extra, 5@—*
*Screw Hook and Strap.* { *6 to 12 in..lb. 3½¢* / *14 to 20 in..lb. 3½¢* / *22 to 36 in..lb. 3 ¢*
*Screw Hook and Eye:*
*¾ to 1 inch.....lb. 5½¢*
*⅝-inch .....lb. 6½¢*
*½-inch .....lb. 8½¢*

### Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers.30&10%

### Hods— Coal—

*Net, per dozen.*

| *Inch..* | *15* | *16* | *17* | *18* |
|---|---|---|---|---|
| *Galv., open* | *$2.15* | *2.40* | *2.55* | *2.80* |
| *Jap., open* | *1.65* | *1.75* | *1.90* | *2.30* |
| *Galv., funnel* | *2.60* | *2.90* | *3.10* | *3.35* |
| *Jap., funnel* | *2.00* | *2.15* | *2.40* | *2.60* |

### Masons' Etc.

Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

### Hoes— Eye-

*Scovil and Oval Pattern,*
*60&10@60&10&10%*
*Grub, list Feb. 23, 1899,*
*70&10@70&10&10%*
D. & H. Scovil.....27½%

### Handled-

Frank's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit.....$2.50

### Holders— Bit-

Angular, ℔ doz. $21.00.....45&10%

### Broom-

Pullman Broom, ℔ gro.....$9.00

### Door-

Bardsley's, Iron, 40%; Bronze.....20%
Empire .....50%
Pullman .....25%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip .....50%
Superior .....40%

### File and Tool-

Nicholson File Holders and File Handles .....33⅓@40%

### Fruit Jar-

Triumph Fruit Jar Holder, ℔ doz.$2.00

### Nipple-

Curtis Nipple Holders.....5%

### Trace and Rein-

Fernald Double Trace Holder, ℔ doz. pairs .....$1.25
Dash Rein Holder, ℔ doz.....$1.25

### Hones—Razor-

Pike Mfg. Co., Belgian and Swaty, 50%; German.....33⅓%

### Hooks—Cast-

Bird Cage, Reading.....50%
Clothes Line, Reading List.....50&5%
Coat and Hat Iron, Reading.....50%
Coat and Hat, Bronze Metal, Reading .....33⅓%
Coat and Hat, Wrightsville.....60&5%
Harness, Reading List.....50%

### Wire-

*Belt, Nos. 1 to 15....75&10@80%*
*Wire C. & H. Hooks..80@80&10%*
Parker Wire Goods Co., King..75&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 75@75&10%; Crown, 75&10@80%; Czar, 70%; Capitol 80%; Czar Harness, 50&10%; Ceiling, 75@80%.

### Miscellaneous-

*Hooks, Bench,* see *Stops, Bench.*
*Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65*
*Grass, best, all sizes, per doz., $2.75@$3.00*
*Grass, common grades, all sizes, per doz.....$1.25@$1.50*
*Hooks and Eyes:*
*Brass .....60@60&10%*
*Malleable Iron.....70@70&10%*
Covert Mfg. Co. Gate and Scuttle Hooks .....25%
Turner & Stanton Co. Cup and Shoulder .....85&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

### Hose, Rubber-

*Garden Hose, ¾-inch:*
*Competition .....ft. 6@6½¢*
*3-ply Guaranteed....ft. 8½@9¢*
*4-ply Guaranteed....ft. 9½@12¢*
*Cotton Garden, ¾-in., coupled:*
*Low Grade.....ft. 8@ 9¢*
*Fair Quality.....ft. 10@11¢*

### Irons— Sad-

*From 4 to 10.....lb. 2½@2¾¢*
*Mrs. Potts', cents per set:*

| | Nos. 50 | 53 | 60 | 65 |
|---|---|---|---|---|
| *Jap'd Caps* | .86 | .91 | .96 | .93 |
| *Tin'd Caps* | .91 | .88 | 1.01 | .98 |

### Bar and Corner-

Richards Mfg. Co., Bar, 60&10%; Corner .....60%

### Jacks, Wagons-

Covert Mfg. Co.:
Auto Screw.....30&10%; Steel, 30%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130...50&10%

### Ladder-

Richards Mfg. Co., Ladder Jacks..50%

### Jointers-

Pike Mfg. Co., Saw Jointers, $7.00..40%

## Knives-

### Butcher, Kitchen, &c.-

Foster Bros.' Butcher, &c.....30%

### Corn-

Columbian Cutlery Co., Wilcut Brand Knives and Hooks.....60%

### Drawing-

*Standard List.....80&10@—%*
C. E. Jennings & Co., Nos. 45, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 66⅔&7½%
Swan's .....66⅔@70%
L. & I. J. White.....20&5@25%

### Hay and Straw-

*Serrated Edge, per doz. $5.00@5.50*
Iwan's Sickle Edge.....℔ doz. $9.00
Iwan's Serrated.....℔ doz. $9.50

### Miscellaneous-

*Farriers' .....doz. $2.60@3.55*

### Knobs-

*Base, 2½-inch, Birch or Maple, Rubber Tip.....gro. $1.25@1.40*
*Door, Mineral.....doz. 65@70¢*
*Door, Por. Jap'd....doz. 70@75¢*
*Door, Por. Nickel..doz. $2.05@2.15*
Bardsley's Wood Door and Shutters.10%

## Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

### Ladles, Melting—

L. & G. Mfg. Co.'s list, Melting and Plumbers' .....25%
P., S. & W.....40&10%
Reading .....50&10%

### Lamps,—

Hammer's M. I. Hand.....40%

### Lanterns—Tubular-

*Regular, No. 0....doz. $4.00@4.50*
*Side Lift, No. 0...doz. $4.25@4.75*
*Hinge Globe, No. 0. doz. $4.25@4.75*
*Other Styles.....40&5%*

### Bull's Eye Police-

*3-inch .....$3.75@4.00*

### Latches— Thumb-

*Roggin's Latches, Jap'd, with Screws .....doz. 35@40¢*

### Door-

Cronk & Carrier Mfg. Co., No. 101, ℔ doz. $2.00
Richards' Bull Dog, Heavy, No. 125 .....50&5%
Richards' Trump, No. 127.....$1.50

### Leaders, Cattle—

*Small.....doz. 50¢; large, 60¢*
Covert Mfg. Co.: Cotton, 55%; Hemp, 45%; Jute, 55%; Sisal, 45%.

### Lifters, Transom—

Reading, Iron, 50&5%; Bronze Metal .....33⅓%
R. & E.....10%

### Lines—

| *Wire Clothes, Nos.* | *18* | *19* | *20* |
|---|---|---|---|
| *100 feet* | *$2.30* | *1.95* | *1.75* |
| *75 feet* | *$1.95* | *1.65* | *1.50* |

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....℔ gr. 30%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....30%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50 .....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....30%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines, White Cotton.....40%
Shade Cord, Cotton or Linen....30%

### Locks— Cabinet-

*Cabinet Locks....33⅓@33⅓@33⅓%*

### Door Locks, Latches, &c.—

*NOTE.—Net Prices are very often made on these goods.*

Reading Hardware Co.....33⅓
R. & E. Mfg. Co.....10%

### Padlocks-

R. & E. Mfg. Co. Wrought Steel and Brass .....75&10%

### Sash, &c.-

Ives' Patent:
Crescent .....25%
Automatic Gravity Metal Sash, ℔ gro., $149.58.....25%
Window Ventilating.....25%
Pullman Patent Ventilating Lock..25%
Reading Sash Locks, Iron.....50%
Reading Sash Locks, Bronze Metal, 33⅓%

## Machines—Boring-

*Com. Upr't, without Augers, $2.00@2.25*
*Com. Angl'r, without Augers, $2.25@2.50*
Ford Auger Bit Co.....$22.00
Jennings', Nos. 1 and 4.....25&7½%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90
Swan's Improved.....40&10%

### Corking-

Reisinger Invincible Hand Power... ℔ doz. $18.00

### Forming, Bending, Etc-

Royal Forming, Bending, Crimping and Fluting, Hand Power, each, $20.00.....40%

### Hoisting-

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake .....20%
Moore's Cyclone High Speed Chain Hoist .....25%

### Ice Cutting-

Chandler's .....12½%

### Mallets-

*Hickory .....45&5@50%*
*Lignumvitæ .....45&5@50%*
*Tinners' Hickory and Applewood .....doz. 45&5@50%*

### Mangers, Stable-

Swett Iron Works.....50%

### Mats, Door-

Acme Flexible Steel.....50%
Elastic Steel (W. G. Co.), new list.50%
Everlasting Flexible Steel.....40%

### Mills, Coffee, &c.-

Enterprise Mfg. Co.:
Coffee .....20@25%
Bone, Shell and Corn.....25&10%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side.....50&10%
Swift, Lane Bros. Co.....30%

### Motors, Water-

Pike Mfg. Co., Tool and Knife Grinding .....33⅓%

### Mowers, Lawn-

*NOTE.—Net prices are generally quoted*
*Cheapest, 10-in., $2.00; advance 10¢ for each size.*
*Cheap, 10-in., $2.25; advance 15@20¢ for each size.*
*Better Grade, 10-in., $3.00; advance 25¢ for each size.*

| | *12* | *14* | *16* | *18 in.* |
|---|---|---|---|---|
| *High Grade* | *$4.50* | *4.75* | *5.00* | *5.25* |

Continental, High and Low Wheel, 50&10%
Great American.....66⅔%
Great American Ball Bearing....66⅔%
Quaker City.....66⅔%
Pennsylvania, High and Low Wheel, 50&10%
Pennsylvania, Jr., Ball Bearing 50&5%
Pennsylvania Golf, 6 Knives, Low Wheel, 33⅓%; High Wheel.....45%
Pennsylvania Golf, Ball Bearing, 7 Knives, High Wheel.....33⅓%
Pennsylvania Horse, 30 and 38 inch, 33⅓&5%
Pennsylvania Pony or Two Man.40&5%
Pennsylvania Grand Horse, 30 and 38 in.....33⅓%

## Nails-

*Wire Nails and Brads, Miscellaneous .....85&5@85&10%*
*Cut and Wire.* See *Trade Report.*
*Hungarian, Finishing, Upholsterers', &c.* See *Tacks.*

### Horse-

*Jobbers' Special Brands, per lb. 9¢*

### Picture-

| | *1½* | *2* | *2½* | *3 in.* |
|---|---|---|---|---|
| *Brass Hd. gro.* | *.45* | *.55* | *.60* | *.70* |
| *Por. Head, gro.* | *1.10* | *1.10* | *1.10* | |

### Upholsters-

*Brass .....30%*
*Plated .....30&10%*

### Nuts— *Blank or Tapped.*

*Cold Punched: Off list.*
*Square .....5.10¢*
*Hexagon .....5.70¢*
*Square, C., T. & R.....5.50¢*
*Hexagon, C., T. & R.....5.30¢*
*Hot Pressed: Off list.*
*Square .....5.50¢*
*Hexagon .....5.95¢*

## Oakum—

*Best .....lb. 6½¢*
*U. S. Navy.....lb. 6 ¢*
*Navy .....lb. 5 ¢*
*Plumbers' Spun Oakum..2¾@3 ¢*

### Oil—

Pike Mfg. Co., Stonoil.....40%

### Oil Tanks—See *Tanks, Oil.*

### Oilers—

*Steel, Copper Plated.....75&10%*
*Chase or Paragon:*
*Brass and Copper.....50&10%*
*Zinc .....65&10@70%*
*Railroad .....60&10&10%*
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%
Hero Fruit Jar Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, etc.....60@60&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 10%; Old Pattern, Nos. 1, 2, 3, 4, 50%.
Maple City Mfg. Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

### Openers, Can—

Triumph Shear Can Openers, doz..$1.20

### Egg-

Hartigan Nickel Plate, ℔ doz., $2.00; Silver Plate, $4.00.

## Packing—

*Asbestos Packing, Wick and Rope, any quantity.....13¢*

### Rubber-

*(Fair quality goods.)*
*Sheet, C. I.....11@12¢*
*Sheet, C. O. S.....11@12¢*
*Sheet, C. B. S.....12@13¢*
*Sheet, Pure Gum.....40@45¢*
*Sheet, Red.....40@50¢*
Jenkins' '96, ℔ lb, 80¢.....25%

### Miscellaneous-

*American Packing....lb. 7@10 ¢*
*Cotton Packing.....lb. 16@25 ¢*
*Italian Packing.....lb. 9@10¢*
*Jute .....lb. 4@4¼¢*
*Russia Packing.....lb. 9@10¢*

### Pails, Galvanized-

*Net, per dozen.*

| Quarts.. | *8* | *10* | *12* | *14* | *16* |
|---|---|---|---|---|---|
| *Light* | *$1.45* | *1.65* | *1.80* | *2.00* | *2.35* |
| *Ex. heavy.* | *$2.65* | *2.85* | *3.00* | *3.35* | |
| *Rd. Bottom* | | | | | |
| *Fire Pails* | *1.95* | *2.10* | *2.30* | ... | |
| *Well Pails* | *1.95* | *2.15* | *2.35* | ... | ... |

### Paint-

Dixon's Silica-Graphite, in 1 gal. pails and 5 gal. kegs, 25%; packages of larger size.....20%

### Pans— Dripping-

*Standard List.....75&10@80%*

### Refrigerator, Galva.-

| *Inch* | *12* | *14* | *16* | *18* |
|---|---|---|---|---|
| *Per doz....* | *$1.75* | *2.25* | *2.80* | *3.15* |

### Paper—Building Paper

*Per roll.*
*Rosin Sized Sheathing: 500 sq. ft.*
*Light weight, 25 lbs. to roll..38¢*
*Medium weight, 30 lbs. to roll. 45¢*
*Heavy weight, 40 lbs. to roll..60¢*
*Black Water Proof Sheathing, 500 sq. ft., light weight, 65¢; medium weight, 95¢; heavy weight, $1.30.*
*Deafening Felt, 9 and 6 sq. ft. to lb., ton.....$40.00*
*Red Rope Roofing, 250 sq. ft. per roll.....$1.75*

### Tarred Paper-

*1 ply (roll 400 sq. ft.), to.. carloads, $31.00; less than carloads .....$32.00*
*2 ply, (roll 168 sq. ft.), 40 lb..48¢*
*3 ply (roll 108 sq. ft.), 60 lb..68¢*
*Slater's Felt (roll 500 sq. ft.), per ton, $35.00; per roll.....70¢*

### Sand Paper and Cloth-

*Flint and Emery.....50&10%*
*Garnet Paper and Cloth.....25%*

### Parers—Apple—

Goodell Co.:
Family Bay State.....⅌ doz. $15.00
Improved Bay State.....⅌ doz. $36.00
New Lightning.....⅌ doz. $7.00
Turn Table '98.....⅌ doz. $6.00
White Mountain.....⅌ doz. $5.00
Bonanza Improved.....each $7.50
Dandy.....each $10.00
New Century.....each $20.00
Ranger.....each $25.00
Rapid Apple Slicer.....each $100.00
Reading Hardware Co.:
Advance.....⅌ doz. $4.00
Baldwin.....⅌ doz. $4.00
Reading 72.....⅌ doz. $3.25
Reading 78.....⅌ doz. $6.25

### Orange—

Goodell Co., Success.....each $20.00

### Potato—

Saratoga.....⅌ doz. $7.00
White Mountain.....⅌ doz. $6.00

### Picks and Mattocks—

*List*.....75&10%
Cronk's Handled Garden Mattock, ⅌ doz., $6.00.....33⅓%

### Pins, Escutcheon—

*Brass*.....50@50&10%
*Iron*.....60@60&10%

### Pipe, Cast Iron Soil—

*Eastern Prices:*
*Standard, 2-6 in.*.....68%
*Extra Heavy, 2-6 in.*....7½%
*Fittings, Standard and Heavy*.....80¾% } *Extra, 10 & 10&5%*

### Pipe, Merchant—

*Carloads to Consumers:*

| | Steel. Blk. % | Galv. % | Iron. Blk. % | Galv. % |
|---|---|---|---|---|
| ⅛ and ¼ in.. | | | | |
| ⅜ in..... | | | | |
| ½ in..... | See Trade Report | | | |
| ¾ to 6 in.... | | | | |
| 7 to 12 in.... | | | | |

### Pipe, Vitrified Sewer—

*Carload lots.*
*Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:*
*First-class*.....85%
*Second-class*.....87%

### Pipe, Stove—

| | Per 100 joints. C. L. | L. C. L. |
|---|---|---|
| Wheeling Corrugating Co.'s Nested: | | |
| 5 in., Uniform Color.. | $5.90 | $6.90 |
| 6 in., Uniform Color.. | 6.40 | 7.40 |
| 7 in., Uniform Color.. | 7.40 | 8.40 |

### Planes and Plane Irons—

#### Wood Planes—

*Bench, first qual*.....30@30&5%
*Bench, second qual*....40@40&5%
*Molding*.....25@25&5%
Chapin-Stephens Co.:
Bench, First Quality.....30%
Bench, Second Quality.....40%
Molding and Miscellaneous.....25%
Toy and German.....30%
Union.....60%

#### Iron Planes—

Union.....60%

#### Plane Irons—

*Wood Bench Plane Irons*....25%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Union.....50%
L. & I. J. White.....20&5@25%

### Planters, Corn, Hand—

Kohler's Eclipse.....⅌ doz. $7.50

### Plates—

*Felloe*.....*lb.* 3¾@4¢
Avery Stamping Co.:
Standard Wrot, Steel Felloe Plates in 100 lb kegs, per 100 lb, ¾-in. to 1¼-in., $4.00 net; 1¼-in. to 2-in., inclusive, $3.75 net.

### Steel Pipe Hook—

Never-Break.....75&10%

### Pliers and Nippers—

*Button Pliers*.....75&5@75&10%
*Gas Burner, per doz., 5 in., $1.25 @$1.50; 6 in., $1.45, $1.50.*
*Gas pipe..* 7 $2.00 | 8 $2.25 | 10 $2.75 | 12-in. $3.50
Acme Nippers.....50%
Cronk & Carrier Mfg. Co.:
American Button.....80%
Improved Button.....75&10%
Cronk's.....60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Elmore Tool Mfg. Co.:
Gas Pliers.....70%
Wire and Cutting Pliers.....75%
Heller's Farriers' Nippers, Pincers and Tools.....40@40&10%
P., S. & W. Tinners' Cutting Nippers.....20%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds....40%

### Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10%
Extension Sights.....30@30&10%
Machinists' Levels.....40@40&10%
Disston & Sons:
Shafting Levels.....60&10%
Pocket Levels.....60&10%
Plumbs and Levels.....60&10%
Track Level and Gauge.....60&10%

### Points, Glaziers'—

*Bulk and 1-lb. papers....lb. 9¢*
*½-lb. papers.....lb. 9½¢*
*¼-lb. papers.....lb. 10¢*

### Police Goods—

*Manufacturers' Lists..25@25&5%*

### Polish—Metal, Etc—

Ladd Co.:
Putzade Liquid, ⅌ gro., ½ pts., $12.00; 1 pts., $20.00; 1 qts., $40.00; ⅌ doz., ½ gals., $6.35; 1 gals., $12.00.
Prestoline Liquid, No. 1 (½ pt.), ⅌ doz., $3.00; No. 2 (1 qu.), $9.00..60%
Prestoline Paste.....40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ⅌ doz. 50¢; ⅌ gro, $4.50; ½ lb boxes, ⅌ doz, $1.25; 1 lb boxes, ⅌ doz. $2.25.
U. S. Liquid, 8 oz. cans, ⅌ doz., $1.25.
Barkeepers' Friend Metal Polish, ⅌ doz., $1.75.

### Stove—

Black Eagle Benzine Paste, 5 lb cans, ⅌ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ⅌ doz. 75¢
Black Jack Paste, ¾ lb cans, ⅌ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon, ⅌ gr. $5.75.....10%
Dixon's Plumbago.....⅌ lb 8¢
Fireside.....⅌ gr. $2.50
Gem, ⅌ gr. $4.50.....10%
Japanese.....⅌ gr. $3.50
Jet Black.....⅌ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ⅌ doz. $1.50

### Window Polish—

Benj. P. Forbes:
Glasbright, 1 lb cans, each.....75¢
Glasbright, Factory, 10 lb pails, ⅌ lb.....25¢

### Poppers, Corn—

*1 qt. Square..doz.$0.80; gro.$8.75*
*1 qt. Round..doz.$0.90; gro.$10.00*
*1½ qt. Square.doz.$1.20; gro..$12.00*
*2 qt. Square..doz.$1.50; gro..$15.00*

### Pots, Glue—

*Enameled*.....40%
*Tinned*.....30&10%

### Powder—

*Black Sporting:*
*Kegs (25 lb.)..$5.00@5.50*
*Half Kegs (12½ lb.), $2.75@3.00*
*Quarter Kegs (6¼ lb.), $1.50@1.65*
*Canisters, pounds... .25*
*Canisters, ½ pounds. .15*
*Canisters, ¼ pounds. .12*
} *Discount to the trade, 10%.*
*NOTE.—Prices vary according to territory.*

### Presses—

Enterprise Mfg. Co., Fruit, Wine and Jelly.....20@25%
Lard Presses and Sausage Stuffers.....25@25&7½%

#### Seal Presses—

Morrill's No. 1, ⅌ doz., $20.00.....50%
Morrill's Pocket, $20.00.....50%

### Pruning Hooks and Shears

See *Shears*.

### Pullers, Nail, Etc.—

Elmore Tool Mfg. Co.:
Drop Forged Tack Claws....50&10%
Standard Tack Claws, No. 10 33⅓&7½%
Nail Pullers.....40%
Miller's Falls, No. 3, ⅌ doz., $12.00.....33⅓&10%
Morrill's No. 1, Nail Puller, ⅌ doz. $20.00.....50%
Pearson Spike Puller, each, $15.00..25%
Parrot Tack and Stub Pullers, ⅌ doz.....$1.20
The Scranton Co. Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00

### Pulleys, Single Wheel—

| | | | | |
|---|---|---|---|---|
| *Inch* | 1½ | 1¾ | 2 | 3 |
| *Awning or Tackle, doz.* | $0.30 | .45 | .60 | 1.05 |
| *Hay Fork, Swivel or Solid Eye, doz., 4 in., $1.25; 5 in., $1.55* | | | | |
| *Inch* | 2 | 2¼ | 2½ | |
| *Hot House, doz.* | $0.65 | .85 | 1.20 | |
| *Inch* | 1¼ | 1½ | 1¾ | 2 |
| *Screw, doz.* | $0.16 | .19 | .23 | .30 |
| *Inch* | 1¾ | 2 | 2¼ | 2½ |
| *Side, doz.* | $0.25 | .40 | .55 | .60 |
| *Inch* | 1½ | 1¾ | 2 | 2½ |

### Sash Pulleys—

*Common Frame; Square or Round End, per doz., 1¾ and 2 in.*.....17@20¢
*Auger Mortise, no Face Plate, per doz., 1¾ and 2 in...20@21¢*
Acme, No. 35..1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle.....50&10%
Wrought Steel, Eagle, ⅌ doz., 1¾ in., 17¢; 2 in., 20¢; 2¼ in.....27¢
Top Notch, Electrically Welded, Nos. 3 and 4, ⅌ doz.....19¢
Common Sense.....⅌ doz. 20¢
Merit, ⅌ doz., 2¼ in.....37¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ⅌ doz. 50%
Grand Rapids All Steel Noiseless..50%
Niagara, No. 35, 1¾ in., 19¢; 2 in.....20½¢
No. 26 Troy..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26....1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

### Pumps—

*Cistern*.....60%
*Pitcher Spout*.....75&10&5@80
*Wood Pumps, Tubing, &c*....50%
Barnes Mfg. Co.:
Dbl. Acting (low list).....50%
Pitcher Spout.....80%
Daisy Spray Pump.....⅌ doz. $6.50
Goulds Mfg. Co.:
Double-Acting Thresher Tank.. $5.00
Diaphragm No. 3, Side Suction.$14.50
Empire, Advance, Seneca, D. A., Shallow and Deep Well (low list).....50%
Spraying and Whitewashing.....$2.45
F. E. Myers & Bros. (low lists):
Double Acting Force and Lift; Cistern and Well; House; Windmill; Ratchet Handle; Pump Stands; Hydro-Pneumatic; Bulldozer Power; Spray; Ashland Force and Lift.....50%
Thresher Tank—Myers and Faultless Low Down Tank.....$5.00
Century Low Down Tank, No. 470.....$5.25
Century Low Down Ratchet Handle Tank, No. R470.....$5.50

### Pump Attachments—

Chicago Hdw. & Fdy. Pump Spout Attachments, each.....$0.27

### Pump Leathers—

*Plunger and Valve Leathers—Per gro.:*

| *No.....* | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | $5.00 | 6.00 | 7.00 | 8.00 |
| *Cup Leathers—Per 100:* | | | | |
| *Inch....* | 2½ | 3 | 3½ | 4 |
| | $5.00 | 7.00 | 9.00 | 12.00 |

} *30@30&5%*

### Punches—

*Saddlers' or Drive, good, doz.50@75¢*
*Spring, single tube, good quality*.....$1.75
*Revolving (4 tubes)....doz.$3.50*
Bemis & Call Co.'s Cast St'l Drive.50%
Elmore Tool Mfg. Co.:
Machinists' Center.....40%
Tinners': Solid, 50%; Prick.....50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55%
Tinners' Hollow, P., S. & W. Co..25%
Tinners' Solid, P., S. & W. Co., ⅌ doz., $1.44.....40&10%

## Rail—Barn Door, &c.—

*Sliding Door, Painted Iron, 2½@2¾¢*
*Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢*.....30%
Cronk's:
Double Braced Steel Rail..⅌ ft. 2¾¢
O. N. T. Rail.....2½¢
Griffin's:
xxx, ⅌ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ⅌ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ⅌ 100 ft.....$3.45
O. N. T., ⅌ 100 ft., 1 in., $3.12½; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in.....⅌ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ⅌ 100 ft., $7.50; 1¼ x 3-16 in., $8.75.....55&7½%
Trolley, No. 301, ⅌ ft.....9¢
McKinney's:
Hinged Hanger Track, ⅌ ft., 11¢ 60&5%
1 x 3-16 Track.....55&7½%
Myers' Stayon Track.....60&10%
Richards Mfg. Co.:
Common, 1 x 3-16 in., $3.00; 1⅛ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail..60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ⅌ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

### Rakes—

Cronk's:
Steel Garden: Champion, ⅌ doz., 12-tooth, $3.75; 14-tooth, $4.00; 16-tooth, $4.25; Ideal, ⅌ doz., 12-tooth, $3.00; 14-tooth, $3.30; 16-tooth, $3.60.
Victor, 12-tooth, $2.25; 14-tooth, $2.50; 16-tooth, $2.75.
Queen City Lawn, ⅌ doz., 20 teeth, $2.35; 24, $2.50.....net
Anticlog Lawn, ⅌ doz.....$3.50
Malleable Garden.....70&10%
Ideal Steel Garden, ⅌ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Jumbo Lawn, 36-tooth....⅌ doz. $5.00
Lawn Queen, 20-tooth....⅌ doz. $2.65
Lawn Queen, 24-tooth....⅌ doz. $2.75
Paragon, 20-tooth.....⅌ doz. $2.40
Paragon, 24-tooth.....⅌ doz. $2.50
Steel Garden, 14-tooth....⅌ doz. $2.10
Malleable Garden, 14-tooth, ⅌ doz. $1.75@2.00

### Rasps, Horse—

Disston's.....75%
Heller Bros.'.....70&5@70&10&5%
Liveright Bros.' Gold Medal.....70%
McCaffrey's American Standard..... 60&10&5%
New Nicholson.....70&10@75%
See also Files.

### Razors—

W. H. Compton Shear Co.....30%

### Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum, German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 9.....25%
4 N, 6 PN, 24 N, 26 PN.....20%
2904 P., 33⅓%; 2904 PN., 33⅓%; 0924 N., 33⅓%; 92084 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓%.
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33⅓%

### Registers—

*Japanned, Electroplated and Bronzed*.....70%
*White Porcelain Enamel..50&10%*
*Solid Brass or Bronze Metal..40%*

### Revolvers—

*Single Action*.....*95¢@$1.00*
*Double Action, except 44 cal..$2.00*
*Double Action, 44 caliber...$2.00*
*Automatic*.....*$4.00*
*Hammerless*.....*$4.50*

### Riddles, Hardware Grade

*16 in.....per doz.$2.50@$2.75*
*17 in.....per doz.$2.75@$3.00*
*18 in.....per doz.$3.00@$3.25*

### Rings and Ringers—

#### Bull Rings—

| | 2 | 2½ | 3 inch. |
|---|---|---|---|
| *Steel* | $0.70 | 0.75 | 0.80 doz. |
| *Copper* | $1.10 | 1.25 | 1.65 doz. |

#### Hog Rings and Ringers—

*Hill's Rings, per gro. boxes, $1.60@$1.75; per doz. boxes, 40@45¢*
*Hill's Ringers, Gray Iron, doz., 55@65¢*
*Hill's Ringers, Malleable Iron, doz.85@95¢*
*Blair's Rings..per gro.$5.50@$6.00*
*Blair's Ringers..per doz.65@70¢*

### Rivets—

*Copper Rivets and Burrs, 50@50&10%*
*Tinners' and Miscellaneous Rivets*.....80&5%

#### Bifurcated and Tubular—

*Assorted in Pasteboard Boxes.*
*Bifurcated, per dozen boxes, 50 count, 40@45¢; 100 count, 50@63¢.*
*Tubular, per doz. boxes, 50 count, 60@68¢; 100 count, $1.12@$1.26.*

### Rollers—

Cronk's Stay, No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60.....$0.75
Lane's Stay.....40%
Myers' Stay.....60%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%

### Rope—

*Manila, 7-16 in. diam. and larger: Highest Grade.....lb.8¼@8½¢*
*Lower Grades.*
*Sisal, 7-16 in. diam. and larger: Highest Grade.....lb.7½@7¾¢*
*Commercial Grade.....lb.6½¢*
*Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Pure.....lb.7¾@8¢*

*Sisal, Tarred, Medium Lath Yarn:*
*Pure* ..... *lb. 6¾@7¢*
*Cotton Rope:*
*Best, ¼-in. and larger. 16½@20¢*
*Medium, ¼-in. and larger. 15@16¢*
*Common, ¼-in. and larger.. 7½¢*
*In coils, ½¢ advance.*
*Jute Rope:*
*Rove, No. 1, ¼-in. and up. lb.* ..... *5@5½¢*

### Wire Rope—

*Galvanized* ..... *$7½&2½%*
*Plain* ..... *55&2½%*

### Ropes, Hammock—

Covert Mfg. Co.:
Jute, $0.75@$0.83; Sisal....$0.82@$0.90

### Rules

*Boxwood* ..... *60&5%*
*Ivory* ..... *25&5%*
Chapin-Stephens Co.:
Boxwood ..... 60%
Flexifold ..... 40%
Ivory ..... 25&25&10%
Miscellaneous ..... 50&50&10%
Stephens' Combination ..... 55%
Stationers' ..... 50&50&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber ..... 50&10%
Upson Nut Co.:
Upson Nut Co., Boxwood ..... 60&5%

## Saws—

Atkins':
Circular ..... 45%
Band ..... 50@50&10%
Butcher Saws ..... 50%
Cross Cuts ..... 35%
One-Man Cross Cut ..... 40%
Narrow Cross Cut ..... 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass ..... 40%
Mulay, Mill and Drag ..... 45%
Wood Saws ..... 40&10%
Chapin-Stephens Co.:
Turning Saws and Frames. 30@30&10%
Disston's:
Circular, Solid and Ins'ted Tooth. 50%
Band, 2 to 18 in. wide ..... 60%
Band, ¼ to 1¾ ..... 60%
Crosscuts ..... 45%
Narrow Crosscuts ..... 50%
Mulay, Mill and Drag ..... 40%
Framed Woodsaws ..... 25%
Woodsaw Blades ..... 25%
Woodsaw Rods, Tinned ..... 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination ..... 30%
Compass, Key Hole, &c. ..... 35%
Hand Ice Saws ..... 45%
Butcher Saws and Blades ..... 30%
C. E. Jennings & Co.'s:
Back Saws ..... 16⅔%
Butcher Saws ..... 25&7½%
Compass and Key Hole Saws, 33⅓&7½%
Framed Wood Saws ..... 25&7½%
Hand Saws ..... 12½%
Wood Saw Blades ..... 33⅓&7½%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35&40%
Peace & Richardson's Hand Saws. 30%
Simonds':
Circular Saws ..... 45%
Crescent Ground Cross Cut Saws. 30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws. 40%
Band Saws ..... 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand.... 45%
Compass, Key Hole, &c. 25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws ..... 50%

### Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A.. 40%
Disston's:
Concave Blades ..... 25%
Chromol Blades ..... 35%
Hack Saw Frames ..... 30%
Simonds, 35%; Bay State, 40%; Culley ..... 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades.... 40&10%
Griffin's Hack Saw Frames.. 35&5&10%
Griffin's Hack Saw Blades.... 35&5&10%
Griffin Co. Hack Saw Blades..... 50%
Star Hack Saws and Blades.... 15&10%
Sterling Hack Saw Blades..30&10&5%
Sterling Hack Saw Frames..30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades ..... 20%
Victor Hack Saw Frames ..... 40%
Victor Hack Saw Machines, each. $75.00

### Scroll—

Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades ..... 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00.. 15&10%

### Scales—

*Union Platform, Plain. $2.10@2.20*
*Union Platform, Stpd. $2.20@2.30*
Chatillon's:
Eureka ..... 35%
Favorite ..... 40%
Grocers' Trip Scales ..... 50%
Reading Hardware Co. ..... 50&5%
The Standard Portables ..... 40%
The Standard R. R. and Wag- ..... 50%

### Scrapers—

Chapin-Stephens Co., Box..30@30&10%
Richards Mfg. Co., Foot ..... 60%

### Screws—Bench and Hand

*Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75*
*Bench, Wood ..... 20@20&10%*
*Hand, Wood.... 70&10@70&10&10%*
Chapin-Stephens Co., Hand ..... 70@70&10&2½%

### Coach, Lag and Hand Rail—

*Lag, Cone Point..... 75&10&5%*
*Coach, Gimlet Point..... 75&10%*
*Hand Rail ..... 70&10@75%*

### Jack Screws—

*Standard List..... 70&10@75%*
Millers Falls ..... 50&10&10%

### Machine—

*Cut Tread, Iron, Brass or Bronze:*
*Flat Head or Round Head, 50&50&10%*
*Fillister Head..... 40@40&10%*
*Rolled Thread, F. H. or R. H., Iron ..... 75&10%*
*F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%*

### Set and Cap—

*Set (Iron)..... 75&10&7½%*
*Set (Steel), net advance over Iron ..... 25%*
*Sq. Hd. Cap..... 70&10&7½%*
*Hex. Hd. Cap..... 70&10&7½%*
*Rd. Hd. Cap..... 50&7½%*
*Fillister Hd. Cap..... 60&7½%*

### Wood—

*List July 23, 1903.*

*Flat Head, Iron..... 87½&5@.. %*
*Round Head, Iron.... 85&5@.. %*
*Flat Head, Brass..... 80&5@.. %*
*Round Head, Brass.. 77½&5@.. %*
*Flat Head, Bronze.... 75&5@.. %*
*Round Head, Bronze. 72½&5@.. %*
*Drive Screws..... 87½&5@.. %*

### Scythes— *Per doz.*

*Plain Grass, Cutting Edge Polished ..... $6.25@$6.50*
*Clipper, Bronze Web. $6.50@$6.75*
*Solid Steel, Web and Backs Polished ..... $7.00@$7.25*
*Bush, Weed and Bramble, Painted ..... $6.50@$6.75*
*Grain, Painted, Cutting Edge Polished ..... $8.25@$8.50*
*Clipper Grain, Bronze Web. $8.50@$8.75*

### Seeders, Raisin—

Enterprise ..... 25@30%

### Sets— Awl and Tool—

Fray's Hollow Tool Handles, Nos. 1, $12; 2, $16; 3, $12..... 50%
Millers Falls Adj. Tool Handles; No. 1, $12; No. 4, $12; No. 5, $18..20&10%

### Sets, Nail—

*Octagon ..... gro. $3.50@3.75*
Buck Bros. ..... 27½%
Elmore Tool Mfg. Co. ..... 30%
Mayhew's ..... ℔ gro. $0.90
Snell's Corrugated, Cup Pt..... 40&10%
Snell's Knurled, Cup Pt..... 40&10%
Victor Knurled, Cup Pt.... ℔ gro. $7.50

### Rivet—

*Regular list..... 75@75&10%*

### Saw—

Atkin's:
Criterion ..... 40%
Adjustable ..... 40%
Disston's Star, Monarch and Triumph ..... 30%
Giant Royal Cross Cut..... ℔ doz. $6.00
Morrill's No. 1..... $15.00
Nos. 3 and 4, Cross Cut.... $20.60
No. 5, Mill..... $30.00
Nos. 10, 11, 95..... $15.60
No. 1 Old Style..... $10.00
Special ..... $16.25
} 50&5%
Royal, Hand..... ℔ doz. $3.50
Seymour Smith & Son's..... 65%
Taintor Positive..... ℔ doz. $0.75

### Sharpeners, Knife—

Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz..... $1.50
Mounted Kitchen Sand Stone, ℔ doz..... $1.50
Natural Grit Carving Knife Hones, ℔ doz..... $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz..... $1.50
Quick Edge Pocket Knife Hones, ℔ doz..... $2.50
} 50%

### Lawn Mower—

Pike Mfg. Co., 12, 14, 16, 18 and 20 in., doz., $6.00..... 33⅓%

### Shavers, Beef—

Enterprise Mfg. Co. ..... 25@30%

### Shaves, Spoke—

*Iron ..... doz. $1.25*
*Wood ..... doz. $2.00*
Chapin-Stephens Co. ..... 30@30&10%
Millers Falls Co., ℔ doz., $9.00.15&10%
Seymour Smith & Son's ..... 60%

### Shears—

| | 7 | 8 | 9 in. |
|---|---|---|---|
| *Cast Iron..* | | | |
| *Best* | *$16.00* | *18.00* | *20.00 gro.* |
| *Good* | *$13.00* | *15.00* | *17.00 gro.* |
| *Cheap* | *$5.00* | *6.00* | *7.00 gro.* |

*Straight Trimmers, &c.:*
*Best quality Jap..... 70&10&5%*
*Best Quality Nickel... 60&10&5%*
*Tailors' Shears..... 40@40&10%*
Acme Cast Shears ..... 40%
Columbian Cutlery Co.:
Sheep, 1900 list ..... 30&10&5%
Grass ..... 50&10%
Horse or Mule ..... 50&10%
W. H. Compton Shear Co.:
Japan Handles, Nickel Blades, Full Nickel ..... 60&10&5%
Tailors' ..... 50&10&5%
J. Wiss & Sons Co.:
Best Quality Jap'd ..... 60&10%
Best Quality Nickeled ..... 50&10%
Tailors' ..... 25%

### Tinners' Snips—

*Steel Blades..... 20&5@20&10%*
*Steel Laid Blades..... 50&10%*
Acme Cast Snips ..... 40%
W. H. Compton Shear Co., Forged Steel Handles ..... 35%
Jennings & Griffin Mfg. Co.'s 6½ to 10 in. ..... 33⅓&7½%
Niagara Snips ..... 40%
P., S. & W. Forged Handles .... 25%
Forged Handles, Steel Blades, Samson ..... 40@40&5%
Triumph Stove Pipe, doz. ..... $6.00
J. Wiss & Sons Co.:
Wiss Forged Steel ..... 25%

### Pruning Shears—

Columbian Cutlery Co.:
Hedge, Wilcut Brand ..... 60&10%
Lawn and Border, Wilcut Brand, 60&10%
W. H. Compton Shear Co., Dropped Forged Steel ..... 35%
Cronk's Hand Shears ..... 33⅓%
Cronk's Wood Handle Shears.... 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz, $18.00..... 25%
Disston's Pruning Hook only, ℔ doz., $12.00..... 25%
J. T. Henry Mfg. Co.:
Pruning Shears, all grades..... 40%
P., S. & W. Co. ..... 40%
Seymour Smith & Son's:
Hand Shears ..... 70%
Standard Tree Pruners..... 75&10%
Wood Handle Pruning Shears.... 40%

### Sheaves—Sliding Door—

Reading ..... 40%
R. & E. list ..... 15%

### Sliding Shutter—

Reading list ..... 40%
R. & E. list ..... 15%

### Shells—Empty—

Brass Shells, Empty:
Climax, 10 and 12 gauge..... 60&5%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, ..... 10%
Climax, 10 and 12 gauge, ..... 5%
10, 12, 16 and 20 gauge ..... 5%
grade ..... 5%
New Club, 10 and 12 gauge, ..... 5%
Grade ..... 5%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge..... 20%
Nitro Club, 10, 12, 16 and 20 gauge; New Club, 14, 16 and 20 gauge; Repeater Grade..... 20%

### Shells, Loaded—

*Loaded with Black Powder..40%*
*Loaded with Smokeless Powder, medium grade..... 40&5%*
*Loaded with Smokeless Powder, high grade..... 40&10&10%*
Union Metallic Cartridge Co.:
New Club, Black Powders..... 40%
Nitro Club, Smokeless Powders, 40&5%
Arrow, Smokeless Powders, 40&10&10%
Winchester:
Smokeless Repeater Grade..... 40&5%
Smokeless Leader Grade...40&10&10%
Black Powder..... 40%

### Shingles, Metal— Per Sq.

Wheeling Corrugating Co.:

| | | |
|---|---|---|
| Dixie, 14 x 20 in.... | $4.05 | $5.05 |
| Dixie, 10 x 14 in.... | 4.25 | 5.45 |
| Dixie, 7 x 10 in.... | 5.25 | 6.70 |

### Shoes, Horse, Mule, &c.—

*F.o.b. Pittsburgh:*
*Iron ..... per keg. $4.10*
*Steel ..... per keg. $3.85*
Burden's, all sizes..... ℔ keg $3.90

### Shot—

*25-lb. bag.*
*Drop, up to B..... $1.70*
*Drop, B and larger..... 1.95*
*Buck ..... 1.95*
*Chilled ..... 1.85*
*Dust ..... 2.30*

### Shovels and Spades—

*Association List..40&7½@40&10%*
Avery Stamping Co. ..... 40%

### Snow Shovels—

*Long Handle..... $2.50@$2.75*
*Wood and Mall, D Handle, $2.65@$2.90*

### Sieves and Sifters—

*Hunter's Imitation, gro.... $9.50*
*Hunter's Genuine, per gro.. $12.00*

### Sieves, Seamless Metallic

*Per dozen.*

| *Mesh* | *1½* | *16* | *18* | *20* |
|---|---|---|---|---|
| *Iron Wire* | *$1.05* | *1.05* | *1.10* | *1.20* |
| *Tinned Wire* | *$1.15* | *1.15* | *1.20* | *1.30* |

### Sieves, Wooden Rim—

*Nested, 10, 11 and 12 Inch.*
*Mesh 18, Nested.... doz. $0.90@0.95*
*Mesh 20, Nested.... doz. $1.00@1.05*
*Mesh 24, Nested.... doz. $1.30@1.40*

### Sinks, Cast Iron—

*Painted, Standard list:*
*12 x 12 to 22 x 36 in..... 60%*
*20 x 24 to 24 x 50 in..... 50%*
*24 x 60 to 24 x 120 in..... 30%*
Barnes' low list, all sizes up to 20 x 40, 60%; larger sizes..... 55%
*NOTE.—There is not entire uniformity in lists used by jobbers.*

### Steel—

Steel Sinks, L. & G. list..... 60%

### Skeins, Wagon—

*Cast Iron..... 70@70&10%*
*Steel ..... 35@40%*

### Slates, School—

*Factory Shipments.*
*"D" Slates..... 50@50&10%*
*Eureka, Unexcelled Noiseless.. 60&7 tens.*
*Victor A, Noiseless. 60&5 tens &5%*

### Sleds—

Little Giant Folding, ℔ doz..... $12.00

### Snaps, Harness—

*German ..... 40@40&10%*
Covert Mfg. Co.:
Polo, King..... 25&10%
High Grade, Covert, Trojan..... 30&10&10%
Yankee, Queen, Yankee Roller..... 30&10%

### Snaths—

*Grass Scythe..... 50@50&5%*

### Spoons and Forks—

### Silver Plated—

*Good Quality..... 50&10@60&5%*
*Cheap ..... 60@60&10%*
International Silver Co:
1847 Rogers Bros. ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand..... 50&10%
Anchor, Rogers Brand..... 60%
Wm. Rogers & Son..... 60&10%

### Miscellaneous

*German Silver..... 60@60&5%*

### Tinned Iron—

*Teas ..... per gro. 50@55¢*
*Tables ..... per gro. $0.90@$1.00*

### Springs— Door—

Bardsley's Spring and Check..... 33⅓%
Chicago (Coil)..... 40&10%
Pullman Door (Coil), ℔ gro..... $10.00
Pullman Gate..... 10%
Reliance (Coil)..... 40&10%

### Carriage, Wagon, &c.—

*1¼ in. and Wider: Per 100 lb.*
*Black ..... $4.75@$5.00*
*Half Bright..... $4.75@$5.00*
*Bright ..... $5.25@$5.50*
*Painted Seat Springs:*
*1½ x 2 x 26.... per pair. 45@47¢*
*1½ x 3 x 28.... per pair. 68@71¢*

### Sprinklers, Lawn—

Enterprise ..... 25@30%
Hero Fruit Jar Co., ℔ doz..... $4.50
Philadelphia No. 1, ℔ doz, $12; No. 2, $15; No. 3, $20..... 30%

### Squares—

*Nickel plated..* } *List Jan. 5, 1900.*
*Steel and Iron..* } *80@80&5%*
*Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10@70%*
*Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%*
Disston's Try Squares and Bevels, 60&10%

### Squeezers, Lemon

*Wood, Porcelain Lined:*
*Cheap ..... doz. $1.00*
*Good Grade..... doz. $1.25*
*Tinned Iron..... doz. $0.75@1.00*
*Iron, Porcelain Lined... doz. $1.75*
Victor, ℔ gro..... $9.00

### Staples—

*Barbed Blind..... 85&5@85&10%*
*Electricians' ..... 80&10&10@85%*
*Fence Staples, Polished, $1.80; Galvanized ..... $2.10*
*Poultry Netting Staples..... per lb. 3¼@3½¢*

### Steels, Butchers'—

Dick's ..... 30%
Foster Bros. ..... 30%

### Steelyards— .... 30@30&10%

### Stocks and Dies—

*Blacksmiths'* .....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates.....25%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plate.....25%

### Stoners, Cherry—

Enterprise .....25@30%

### Stones, Axe—

Pike Mfg. Co., Axe Stones (all kinds) .....33⅓%

### Glass Cutters' Stones—

Pike Mfg. Co., Glass Cutters' Stones and Supplies.....40%

### Stones, Oil, &c.—

| Pike Mfg. Co., 1907 list: | ℔ | lb |
|---|---|---|
| Arkansas St., No. 1, 3 to 5½ in. | $2.80 | |
| Arkansas St., No. 1, 5½ to 8 in. | $3.50 | |
| Arkansas Slips No. 1 | $4.00 | |
| Lily White Washita, 4 to 8 in. | 60¢ | |
| Rosy Red Washita, 4 to 8 in. | 60¢ | |
| Washita St., Extra, 4 to 8 in. | 50¢ | |
| Washita St., No. 1, 4 to 8 in. | 40¢ | |
| Washita St., No. 2, 4 to 8 in. | 25¢ | |
| Lily White Slips | 90¢ | |
| Rosy Red Slips | 90¢ | |
| Washita Slips, Extra | 80¢ | |
| Washita Slips, No. 1 | 70¢ | |
| Washita Slips, No. 2 | 40¢ | |
| India Oil Stones (entire list) | 33⅓% | |
| Quickcut Emery and Corundum Oil Stone, Double Grit | 40% | |
| Quickcut Emery and Corundum Axe Stone, Double Grit | 33⅓% | |
| Quickcut Emery Rubbing Bricks | 40% | |
| Hindostan No. 1, R'g'lar. | ℔ 8¢ | |
| Hindostan No. 1, Small | ℔ 10¢ | |
| Turkey Oil Stones, Extra, 5 to 8 in. | ℔ 80¢ | |
| Queer Creek Stones, 4 to 8 in. | 20¢ | |
| Queer Creek Slips | 40¢ | |
| Sand Stone | 6¢ | |

### Scythe Stones—

| Pike Mfg. Co., 1907 list: | |
|---|---|
| Black Diamond S. S. | ℔ gro. $12.00 |
| Lamoille S. S. | ℔ gro. $11.00 |
| White Mountain S. S. | ℔ gro. $9.50 |
| Green Mountain S. S. | ℔ gro. $7.00 |
| Extra Indian Pond S. S. | ℔ gro. $8.00 |
| No. 1 Indian Pond S. S. | ℔ gro. $7.50 |
| No. 2 Indian Pond S. S. | ℔ gro. $5.00 |
| Leader Red End S. S. | ℔ gro. $5.00 |
| Quick Cut Emery | ℔ gro. $10.00 |
| Pure Corundum | ℔ gro. $18.00 |
| Crescent | $7.00 |
| Emery Scythe Rifles, 2 Coat. | $8.80 |
| Emery Scythe Rifles, 3 Coat. | $11.00 |
| Emery Scythe Rifles, 4 Coat. | $13.20 |
| Balance of 1907 list | 33⅓% |
| Lectro (Artificial), | ℔ gro., $12.00, 33⅓% |
| $12.00 | 33⅓% |
| Lightning (Artificial), | ℔ gro., $18.00 33⅓% |

### Stoppers, Bottle—

Victor Bottle Stoppers.....℔ gro. $9.00

### Stops— Bench—

Millers Falls.....15&10%
Morrill's, ℔ doz., No. 1, $10.00....50%
Morrill's, No. 2, $12.50.....50%
Seymour Smith & Son's.....60%

### Door—

Chapin-Stephens Co.....50@50&10%

### Plane—

Chapin-Stevens Co.....30%

### Straps— Box—

Acme Embossed, case lots...20&10&10%
Cary's Universal, case lots...20&10&10%

### Stroppers, Razor—

Pullman Safety Razor Blade, doz. $8.50

### Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and Lard Presses.....25@25&7½%
P., S. & W. Co.....40&10&5%

### Swings, Lawn—

Myers' Low Down Roller.....$6.25

### Tacks, Finishing Nails, &c.

*American Carpet Tacks.*90&25@—%
*American Cut Tacks*..90&25@—%
*Swedes' Cut Tacks*.L..90&30@—%
*Swedes' Upholsterers'*..90&35@—%
*Gimp Tacks*.....90&35@—%
*Lace Tacks*.....90&35@—%
*Trimmers' Tacks*.....90&30@—%
*Looking Glass Tacks*.....65@—%
*Bill Posters' and Railroad Tacks*, 90&40@—%
*Hungarian Nails*.....80@—%
*Finishing Nails*.....70@—%
*Trunk and Clout Nails*.75&5@—%
*NOTE.—The above prices are for Straight Weights*
See also Nails, Wire.

### Double Pointed—

*Double Pointed Tacks*, 90&6 tens@—%

### Tapes, Measuring—

*American Asses' Skin*....50@—%
*Patent Leather*.....25@30&5%
*Steel* .....35⅓&5%
*Chesterman's* .....25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.

Lufkins:
Asses' Skin.....40&10@50%
Metallic .....30@30&5%
Patent Bend, Leather...25&5@25&10%
Pocket .....40@40&5%
Steel .....33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. .....25%
Chesterman's Steel, No. 1038L, etc. .....35%

### Teeth, Harrow—

*Steel Harrow Teeth, plain or headed, ¾-inch and larger per 100 lb*.....$2.55@$2.80

### Thermometers—

*Tin Case, Cabinet, Flange, Dairy, &c*.....30@35%

### Ties, Bale—Steel Wire—

*Single Loop*.....82½&10%
*Monitor, Cross Head, &c.*70&2½%

### Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

### Tops, Chimney—

Iwan Volcano Chimney Tops.....55%

### Tools—Coopers'—

L. & I. J. White.....20@20&5%

### Ice Tools—

Gifford-Wood Co.....15%

### Saw—

Atkins' Cross Cut Saw Tools.....35%
Simond's Improved.....33⅓%
Simonds' Crescent.....30%

### Ship—

L. & I. J. White.....25%

### Torches—

Hammers, Engine, ℔ doz.....$1.50

### Traps—Fly—

*Balloon, Globe or Acme, doz., $1.15@$1.25; gro.*....$11.50@12.00
*Harper, Champion or Paragon, doz., $1.25@1.40; gro. $13.00@13.50*

### Game—

*Imitation Oneida*.....75@10%
Newhouse .....50&5%
Hawley & Norton.....65&10%
Victor .....75@75&10%
Oneida Community Jump.....70&5%
Stop Thief.....60%
Tree Trap.....60%
Hector .....75@75&5%

### Mouse and Rat—

*Mouse, Wood, Choker, doz. holes, 12¢*
*Mouse, Round or Square Wire, doz. 85@90¢*

### Trowels—

Disston Brick and Pointing.....25%
Disston Plastering.....20%
Disston "Standard Brand" and Garden Trowels.....30%
Kohler's Steel Garden Trowels, ℔ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break, Forged Steel Garden Trowels, in 1 doz. boxes, ℔ gro. $6.50
Woodrough & McPartlin, Plastering.25%

### Trucks, Warehouse, &c.—

McKinney Trucks.....each, net $10.00

### Tubs, Wash—

*Net, per gross.*

| No. | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| *Galvanized* | $29.00 | 48.00 | 55.00 | 62.00 |

### Twine, Miscellaneous—

*Flax Twine:*
*No. 9, ¼ and ½-lb. Balls*.21@23¢
*No. 12, ¼ and ½-lb. Balls*.19@21¢
*No. 18, ¼ and ½-lb. Balls*.16@18¢
*No. 24, ¼ and ½ -lb. Balls*. 15½@17½¢
*No. 36, ¼ and ½-lb. Balls*.15@17¢
*Chalk Line, Cotton ½-lb. Balls* .....24@29¢
*Cotton Mops, 6, 9, 12 and 15 lb. to doz*.....8½@21¢
*Cotton Wrapping, 5 Balls to lb., according to quality*..13½@21¢
*American 2-Ply Hemp, ¼ and ½-lb. Balls*.....13½@15¢
*American 3-Ply Hemp, 1-lb Balls* .....13½@16¢
*India, 2-Ply Hemp, 1½-lb. Balls, Balls (Spring Twine)*...7½@9¢
*India 3-Ply Hemp, 1-lb. Balls* 7½@9¢
*India 2-Ply Hemp, 1½-lb. Balls*, 7@8½¢
*2, 3, 4 and 5-Ply Jute, 1¼-lb. Balls* .....9@11¢
*Mason Line, Linen, ½-lb. Bls.*7¢
*No. 264 Mattress, ¼ and ½ lb. Balls, according to quality*. 30@60¢
*Wool, 3 to 6 ply*....*B* 6¢; *A* 7½¢

### Vises—

*Solid Box*.....60@60&10%

### Parallel—

Fisher & Norris Double Screw Leg, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00; 6, $32.00.....20%
Fisher-Brooks Bench and Woodworkers' Vises, No. 0, $3.80; No. 1, $5.90; No. 2, $8.25; No. 3, $10.50; No. 4, $13.50.....40%
Merrill's .....25%
Millers Falls Oval Slide Pattern.60&10%
Parker's:
Victor, 20@25%; Regulars....20@25%
Vulcan's .....40@45%
Combination Pipe.....55@60%
Prentiss Vise Co.:
Patent, Bicycle, Shepard, Gipsy, Adj. Column, Lewis Adj. Jaw..25%
Rapid Transit, Heavy Chipping..30%
Bull Dog, Anchor Line, Yankee Quick Lever, Lewis Solid Jaw, Eclipse Wrench Attachment...40%
Monarch .....45%
Vise Jaw Caps .....10%
Pullman Automatic Bench, ℔ doz., No. 1, $7.50; No. 2.....$9.50

### Pipe—

Curtis & Curtis Malleable.....25%
Parker's Combination:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.
Prentiss Vise Co.:
Blake Combination, Prentiss Combination, Prentiss.....60%
Malleable; Monarch Combination 65%
Rex Combination.....70%
Peerless Pipe Grip.....25%

### Saw Filers

Disston's D 3 Clamp and Guide, ℔ doz., $24.00, 30%; Clamps.....30%
Reading .....50&10%

### Wood Workers—

Prentiss Cabinet Makers'.....40%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

### Wads—*Price per M.*

*B. E., 11 up*..... 60¢
*B. E., 9 and 10*..... .70¢
*B. E., 8*..... .80¢
*B. E., 7*..... .80¢
*P. E., 11 up*.....$1.00
*P. E., 9 and 10*..... 1.25
*P. E., 8*..... 1.50
*P. E., 7*..... 1.50
*Ely's B. E., 11 and larger*.$1.70@1.75
*Ely's P. E., 12 to 20*....$3.00@3.25
*Dis. 15%*

### Ware, Hollow—Cast Iron, Hollow—

*Store Hollow Ware:*
*Enameled* .....45&10%
*Ground* .....50&5%
*Plain or Unground*.....60%
*Country Hollow Ware, per 100 lbs* .....$2.75@$3.00
*White Enameled Ware:*
*Maslin Kettles*.....65&10%
*Covered Wares:*
*Tinned and Turned*.....35&10%
*Enameled* .....45&10%
See also *Pots, Glue.*

### Enameled—

Agate Nickel Steel Ware.....33⅓%
El-an-ge .....60&10%
Iron Clad Ware.....70&10%
Lava and Volcanic, Enameled..40&10%

### Tea Kettles—

*Galvanized Tea Kettles:*

| *Inch* | 6 | 7 | 8 | 9 |
|---|---|---|---|---|
| *Each* | 45¢ | 50¢ | 55¢ | 65¢ |

### Steel Hollow Ware—

Avery Stamping Co.:
Never-Break Spiders and Griddles .....65&10%
Steel Kettles, Maslins Scotch Bowls, Tin'd.....60%
Steel Stew Pans, Stew Pots, etc., Porcelained .....50%
Cleveland Stamping & Tool Co.:
Solid Steel Spiders and Griddles .....65&5%
Solid Steel Kettles.....60&5%

### Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

### Washboards—

| No. | ℔ doz. |
|---|---|
| 800—Brass King, Single Surface, Open Back | $3.00 |
| 801—Brass King, Single Surface, Open Back | $2.50 |
| 802—Brass Junior, Single Surface, Open Back | $2.25 |
| 862—White Hen, Spiral Crimp Glass | $3.15 |
| 964—Royal Blue Enamel, Single Surface, Ventilated Back | $3.25 |
| 172—Our Best, Single Zinc, Soap Drainer | $3.25 |
| 722—Soap Saver, Single Zinc, Iron Top | $3.35 |
| 100—Northern Queen, Single Zinc, Perforated, Open Back | $3.00 |
| 134—Universal, Single Zinc, Extra Family Size, Ventilated Back | $2.80 |
| 710—Regal, Single Zinc, Extra Family Size, Ventilated Back | $2.50 |
| 760—Banner Globe, Single Zinc, Ventilated Back | $2.25 |
| 57—Peerless, Double Zinc, Spring Protector | $3.70 |
| 56—Red Cross, Double Zinc, Swing Protector | $3.60 |
| 17—North Star, Solid Zinc, Swing Protector | $3.60 |
| 797—Jewel, Single Zinc, Pail Size. | $1.25 |

### Washers—Leather, Axle—

*Solid* .....90@90&10%
*Patent* .....90@90&5%
*Coil:* ⅝ 9¢ | 1 10¢ | 1⅛ 11¢ | 1¼ *inch.* 12¢ *per box.*

### Iron or Steel—

*Size bolt*.... *5-16* ⅜ ½ ⅝ ¾
*Washers*....$4.90 4.00 2.70 2.50 2.30
*The above prices are based on $6.50 off list.*
*In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.*
Avery Stamping Co.:
Standard, in 200 lb kegs, $6.00 ℔ 100 lb. disct.; in 100 lb kegs add 10¢ net ℔ 100 lb; in 5 or 10 lb boxes, add 50¢ net ℔ 100 lb; in 1 lb Loxes, add $1.00 net ℔ 100 lb.

### Cast Washers—

*Over ½-inch, barrel lots, per lb*.1½@1¾¢

### Wedges—

*Oil Finish*.....*lb.*, 2¼@2¾¢

### Weights—Hitching—

Covert Mfg. Co.....25%

### Sash—

*Per net ton, Eastern market,* $25.00@—

### Wheels, Corundum and Emery—

Pike Mfg. Co., Corundum, 65%; Emery .....75%

### Well—

*8-in., $2.00; 10-in., $2.30; 12-in., $3.06; 14-in., $4.45.*

### Wire and Wire Goods—

### Market and Stone Wire in Bundles—

*Bright and Annealed:*
*9 and coarser*.....80%
*10 to 18*.....80&10%
*19 to 26*.....80&10&2½%
*27 to 36*.....80&5%
*Galvanized:*
*9 and coarser*.....75&10%
*10 to 16*.....75&10%
*17 to 26*.....72½&10%
*27 to 36*.....72½%
*Coppered:*
*9 and coarser*.....75&10%
*10 to 26*.....75&10%
*27 to 36*.....70&10&5%
*Tinned:*
*6 to 18*.....75&10&10%
*Brass*.....15¾¢ *lb., base*
*Copper*.....14⅞10¢ *lb., base*
*Cast Steel Wire*.....50%

### Spooled Wire—

*Annealed and Tinned,* 70&10&10&10%
*Brass and Copper*...60&10&10&10%
*Retailers' Assortments, per box,* $1.90@$2.10

### Bright Wire Goods—

*Steel Wire Goods*.....90&35%
*Brass Wire Goods*.....90&35%
*Brass Cup and Shoulder Hooks,* 85%

### Wire Cloth and Netting—

*Galvanized Poultry Netting,* 80&10@80&10&5%
*Screen Cloth, 12 Mesh, Per 100 sq. ft.; Painted, $1.35; Galvanized, $1.95; 14 Mesh, Bronze $6.50.*
*Standard Galv. Hardware Grade: 100 ft. rolls, 2½ to 48 in. wide, Per 100 sq. ft.*
*Nos. 2, 2½ and 3 Mesh*....$2.75
*Nos. 4 and 5 Mesh*.....$3.00
*No. 6 Mesh*.....$3.25
*Nos. 7 and 8 Mesh*.....$3.75

### Wire, Barb—See *Trade Report*

### Wrenches—

*Agricultural* .....75&10@80&5%
*Alligator or Crocodile*.70&10@75%
*Baxter Pattern S Wrenches,* 70&5@70&10%
*Drop Forged S*.....45@45&5%
Acme .....60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable S Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%.
Steel Handle Nut.....50&5%
Combination Black.....50&5%
Merrick Pattern.....50&5%
Coes' Genuine Knife Hdl...40&10&5%
Coes' Genuine Steel Hdl...40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes' Genuine Hammer Handle..... 40&10&5&5%
Coes' "Mechanics'"...40&10&10&5&5%
Hercules .....70%
W. & B. Machinist:
Case lots.....50&10%
Less than case lots.....50%
W. & B. Railroad Special:
Case lots.....50%
Less than case lots.....40&10&5%
Solid Handles, P., S. & W..50&10%; full cases.....50&10&5%
Vulcan and Agrippa Chain.....50%
Wizard Adjustable Ratchet.....50%

### Can and Jar—

Benj. P. Forbes Triumph, doz., $0.75; Triumph Syrup Cap, gro. $4.00

### Wrought Goods—

*Staple Hooks, &c., list March 17, '08*.....90@—%

### Zinc—

*(Cask lots, 600 lb., at mill.)*
*Sheet*.....*per 100 lb.*, $7.50

For the Table of "Current Metal Prices" see the First Issue of Every Month.